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/Kathryn Marley/
Kathryn Marley

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of inventor(s):.
Lukas van Ginneken et al.

Application No. **10/828,547**

Confirmation No. **3884**

Filing Date: **19 April 2004**

Title: **Timing Closure Methodology**

Group Art Unit: **2825**
Examiner: **Vuthe Siek**

CUSTOMER NO. 36454

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DISCLOSURE CONCERNING RELATED LITIGATION

Sir:

Submitted herewith please find an Order from litigation related to the present application:

(1) Memorandum of Decision: Findings of Fact and Conclusions of Law Re: Patent Ownership in *Synopsys Inc. v. Magma Design Automation, Inc. In the U.S. District Court for the Northern District of California, C-04-3923.*
(2) Stipulation and Order Re: Dismissal in *Synopsys Inc. v. Magma Design Automation, Inc. In the U.S. District Court for the Northern District of California, C-04-3923.*

The Commissioner is hereby authorized to charge any fees determined to be due in connection with this communication to our Deposit Account No. 50-0869 (SYNP 1006-0).

Respectfully submitted,

Dated: 03 November 2008

/ Mark. A. Haynes /
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IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

SYNOPSYS, INC.,

Plaintiff,

v.

MAGMA DESIGN AUTOMATION, INC.,

Defendant.

/

No. C-04-3923 MMC

MEMORANDUM OF DECISION; FINDINGS OF FACT AND CONCLUSIONS OF LAW RE: PATENT OWNERSHIP

On September 17, 2004, plaintiff Synopsys, Inc. ("Synopsys") filed the above-titled action for patent infringement against defendant Magma Design Automation, Inc. ("Magma"). Pursuant to stipulation of the parties, trial was bifurcated, and the bifurcated issues were tried to the Court from April 24, 2006 through May 10, 2006.

Pursuant to stipulation, (see Docket Nos. 986, 990, 1024), the trial encompassed the following issues: (1) ownership of United States Patents Nos. 6,453,446 ("'446 patent), 6,725,438 ("'438 patent), and 6,378,114 ("'114 patent"), as well as any continuations or foreign counterparts of said patents; (2) Magma's Second, Fourth, Sixth, and Tenth Counterclaims; and (3) Magma's Seventh Affirmative Defense. Pursuant to its Second, Sixth, and Tenth counterclaims, Magma seeks a declaratory judgment that IBM is a joint owner of, respectively, the '114, '446, and '438 patents. (See Magma's Answer to Third Amended Complaint ("TAC Answer"), filed September 2, 2005, ¶¶ 206-210, 227-231, 246-

250.) Pursuant to the Fourth Counterclaim, Magma seeks a declaratory judgment that Magma is a co-owner of the '446 and '438 patents. (See id. ¶¶ 216-221.) Magma's Seventh Affirmative Defense is that the '446 and '438 patents were not assigned to Synopsys pursuant to the Proprietary Information and Inventions Agreement between Lukas van Ginneken ("van Ginneken") and Synopsys or, in the alternative, that only a partial interest in said patents was assigned to Synopsys and that a partial interest is also held by Magma and/or IBM. (See id. ¶¶ 151-153.)

On June 9, 2006, the parties filed simultaneous post-trial memoranda and proposed findings of fact and conclusions of law. On June 30, 2006, the parties filed simultaneous reply post-trial memoranda.

Having fully considered the evidence submitted, the papers filed in support of and in opposition to the parties' respective positions, and the arguments of counsel, the Court by this memorandum of decision issues its findings of fact and conclusions of law, pursuant to Rule 52(a) of the Federal Rules of Civil Procedure.

FINDINGS OF FACT

A. THE PATENTS

1. The '446 patent, titled "Timing Closure Methodology," provides on its face that van Ginneken is the sole inventor, and that Magma is the assignee. (See Ex. 3 at 1.)

2. The '438 patent, also titled "Timing Closure Methodology," provides on its face that van Ginneken is the sole inventor, and that Magma is the assignee. (See Ex. 1 at 1.)

3. The '114 patent, titled "Method for the Physical Placement of an Integrated Circuit Adaptive to Netlist Changes," provides on its face that van Ginneken and Narendra V. Shenoy ("Shenoy") are co-inventors, and that Synopsys is the assignee. (See Ex. 5 at 1.)

B. ELECTRONIC DESIGN AUTOMATION

4. Electronic Design Automation ("EDA") companies such as Magma and Synopsys develop computer programs that are used to design integrated circuits ("ICs" or

"chips"). The building blocks of a chip are logic cells ("gates" or "cells"), each of which carries out some basic logical function.

5. Determining where to place the cells on the chip such that the cells (1) fit within the boundaries of the chip and (2) meet the prescribed timing constraints is an extraordinarily difficult problem. Complex chips can comprise millions of cells.

6. EDA software provides a solution to this problem. EDA software is an automated means of placing and routing the cells. In a process known as logic synthesis (or simply "synthesis"), IC designers use EDA software to translate high level descriptions of an IC into the components that will be fabricated on the chip. In a process known as physical design, IC designers use EDA software to create a detailed physical layout of the chip, precisely locating within the chip's boundary each of the components and the wires that interconnect them.

7. A cell is made up of transistors that are designed to perform a logical function, such as comparing two signals and producing a result. The simplest cell is called an "inverter," or a "NOT" cell. It takes one binary digit (1 or 0) as input and produces its opposite (0 or 1, respectively) as output. 0 represents no electrical flow, and 1 represents electrical flow.

8. Cells are connected with other cells to form ICs. Once the cells are placed and interconnected, each cell performs its specified function (such as inverting the signal) and communicates the result to the next cell. The time that it takes for a cell to carry out its function and communicate the result to the next cell is referred to as delay. Delay is affected by (1) the size of the cell and (2) the load placed on the cell, i.e., the amount of effort the cell must exert to communicate its result to the next cell. A larger cell can exert more driving power than a smaller cell, and more power results in a shorter delay for a given load. A longer wire places a greater load on the cell because more effort is required to communicate a result through that longer wire to the next cell. A greater load thus causes a greater delay for a given size cell. Larger cells consume more power and area, however, and thus may be undesirable.

9. During the design process, cells are typically selected from a cell library during synthesis. The cell selection may be informed by the overall timing constraints for the chip. Thus, the EDA software will estimate the timing goals for a particular path of cells and select the cells to meet those goals. The output of synthesis is a data file, known as a "netlist," describing the cells and their interconnections.

10. During the design process, however, the cell loads will change as changes are made in the physical design. As cells are spaced apart, for example, the length of the interconnecting wires may increase, thereby increasing the load on the cell. As the load on the cell is increased during the design process, the delay for the cell also increases. This requires the EDA software to iterate between logic synthesis and physical design; as changes are made that alter the cell delay, the designer must repeat the synthesis process to select larger or smaller cells.

C. THE SYNOPSYS AND IBM ALLIANCE: JOINT DEVELOPMENT AGREEMENT

11. IBM and Synopsys entered into a Joint Development and License Agreement Concerning EDA Software and Related Intellectual Property ("JDA") to develop advanced, commercially viable, EDA software tools for designing and testing integrated circuits comprising more than one million logic gates. (See Trial Exhibit (hereafter "Ex.") 1120 § 2.2.)

12. Pursuant to its provisions, the JDA became effective January 1, 1996. (See Ex. 1120 at 1.) Synopsys executed the JDA on February 1, 1996, and IBM executed it on February 20, 1996. (See Ex. 1120 at 39.)

13. The JDA addresses the proposed development of several "Joint Products" and a "Next Generation Synthesis System" ("NGSS"). (See Ex. 1120 ¶ 1.26, 1.32, 2.1.)

14. The JDA identifies the following Joint Products: Design Planner, Static Timing, Test, and, as of two years after the effective date of the JDA, CLTA. (See Ex. 1120 § 1.26.) Design Planner, Static Timing, Test and CLTA are EDA software tools. (See id.;

Trial Transcript (hereafter "Tr.") 1016:11-1017:17, 1019:4-6 (Camposano).)[1]

15. NGSS is defined as "an EDA synthesis software product that performs logic synthesis, that is owned by Synopsys and that is based on Design Compiler or Enhanced Design Compiler and BooleDozer." (See Ex. 1120 § 1.31.) NGSS "shall perform both high-end (microprocessor) and mainstream (ASIC) logic synthesis." (See id.)

16. IBM and Synopsys anticipated that their product development activities would result in the creation of inventions. (See Ex. 1120 § 4.1.2.1.)

17. The JDA distinguishes inventions developed solely by one party from inventions that resulted from the parties' collaborative efforts. (See Ex. 1120 § 4.1.2.1.) The JDA defines "Invention" as "any discovery or improvement, conceived or first reduced to practice during the term of this Agreement in the performance of this Agreement, solely or jointly by one or more employees of Synopsys, or solely or jointly by one or more employees of IBM." (See Ex. 1120 § 1.24.) A "Joint Invention" is "an Invention conceived or first reduced to practice by one or more employees of one party jointly with one or more employees of the other party." (See Ex. 1120 § 1.25.)

18. The JDA also distinguishes between ownership of the products under development and ownership of any Inventions and Joint Inventions arising from IBM's and Synopsys's joint product development activities. (See Ex. 1120 § 4.0 et seq.)

19. Section 4.1 of the JDA governs the "ownership of the intellectual property of each party relevant to the [JDA]." (See Ex. 1120 § 4.1.)

20. The JDA divides intellectual property into two categories: intellectual property created outside the JDA's product development activities, (see Ex. 1120 § 4.1.1), and intellectual property created in furtherance of the JDA's product development activities, (see Ex. 1120 § 4.1.2.)

21. Section 4.1.1 addresses ownership of intellectual property created outside the product development activities of the JDA. It provides, "Each party shall retain full

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[1] The identity of the testifying witness is included in a parenthetical notation following the citation to the trial transcript.

ownership rights to its pre-existing intellectual property or independently developed intellectual property (i.e. intellectual property developed separate from the product development activities of this Agreement) that is incorporated into Joint Product Information, NGSS Information or Enhanced Design Compiler." (See Ex. 1120 § 4.1.1.)

22. Under § 4.1.1, pre-existing or independently developed intellectual property is solely owned by the party who created it, even if that intellectual property is incorporated into the parties' joint work product. (See id.)

23. The parties agreed to license to each other certain specified separately-created intellectual property for use in developing, marketing, and supporting the Joint Products and NGSS. (See Ex. 1120 §§ 4.2 through 4.4.)

24. Section 4.1.2 of the JDA addresses the ownership of Inventions created in furtherance of the JDA's product development activities, and the ownership of resulting EDA tools. Accordingly, it carries the preamble, "As to the Joint Products and NGSS." (See Ex. 1120 § 4.1.2.)

25. Section 4.1.2.1 addresses ownership of Inventions created both individually and jointly in the performance of the JDA's product development activities:

> Any Invention made by one party shall be owned by that party, subject to the patent license granted to the other party elsewhere in this Section 4.0. Any Joint Invention shall be jointly owned, title to all patents thereon shall be joint, all expenses incurred in obtaining and maintaining such patents, except as provided hereinafter, shall be jointly shared, and the parties shall have the unrestricted right to license Subsidiaries . . . and third parties thereunder without accounting.

(See Ex. 1120 § 4.1.2.1.)

26. Under § 4.1.2.1, IBM and Synopsys co-own any Invention that they jointly conceived or jointly first reduced to practice as part of the product development activities under the JDA. (See Ex. 1120 §§ 4.1.2.1, 1.25.)

27. Section 4.1.2.2 addresses the parties' ownership of the Joint Products and NGSS:

> Other than any Invention or Joint Invention as set forth above, the Joint Products shall be jointly owned by the parties, and NGSS shall be solely owned by Synopsys . . . To the extent that the Joint Products or NGSS

> incorporate the pre-existing or independently developed intellectual property of either party as set forth in Section 4.1.1 to this Agreement, such ownership rights for Joint Products or NGSS shall be subject to the rights and licenses granted in this Section 4.0 as to such intellectual property . . . .

(See Ex. 1120 § 4.1.2.2.)

28. The Joint Products were to be jointly owned by IBM and Synopsys. (See Ex. 1120 § 4.1.2.2.)

29. NGSS was to be owned by Synopsys. (See Ex. 1120 § 4.1.2.2.)

30. The parties' goal was to develop Joint Products and NGSS as "successful commercial products." (See Ex. 1120 § 2.2.)

31. Sections 4.1.2.1 and 4.1.2.2 provide that the incorporation of a separately-created Invention or Joint Invention into NGSS or a Joint Product does not change the ownership of the Invention or Joint Invention (which remains owned by the party or parties who created it) or the ownership of the Joint Products. (See Ex. 1120 §§ 4.1.2.1, 4.1.2.2.)

32. Under § 4.1.1, if a party owns pre-existing intellectual property, or intellectual property developed separately from the JDA's product development activities, the party retains full ownership rights to that intellectual property even if it is incorporated into Joint Product Information, NGSS Information, or Enhanced Design Compiler. (See Ex. 1120 § 4.1.1.)

33. "NGSS Information," is "Information generated by the Joint Development Team relating to any specific result of the parties' partial or completed development work, relating to NGSS," including but "not limited to, any tool specification, design Information, Code, Documentation, specification, or quality or reliability Information for any NGSS." (See Ex. 1120 § 1.32.) "Information" includes "information in visual, oral, written or other tangible form" that the parties may disclose to one another, or that may be created by one or both parties, during the term of the JDA. (See Ex. 1120 § 1.23.)

34. The JDA grants each party a license to use NGSS information for specified purposes. (See Ex. 1120 §§ 4.4, 4.5.)

35. Under § 4.1.2.2, if Joint Products or NGSS incorporate pre-existing or independently developed intellectual property, ownership rights to that intellectual property are subject to the rights and licenses granted elsewhere in § 4.0. (See Ex. 1120 § 4.1.2.2.)

36. On December 22, 1998, Synopsys and IBM entered into a Dissolution Agreement, which dissolved the JDA, effective January 1, 1999. (See Ex. 1120 at IBM000093.)

37. Pursuant to the Dissolution Agreement, any provision of the JDA "not expressly included in or expressly amended by" the Dissolution Agreement is to have no force or effect after the Dissolution Date, and any JDA "provisions amended [t]herein will have force and effect as amended." (See Ex. 1120 at IBM00094.) Section 4 of the JDA, which includes the provisions relating to ownership of intellectual property, was expressly incorporated into the Dissolution Agreement, and remains in effect. (See Ex. 1120 at IBM000098.)

38. Section 13 of the Dissolution Agreement obligates IBM to inform its employees "of the restrictions on IBM's use of Joint Product Information and NGSS Information" acquired during the term of the JDA. (See Ex. 1120 at IBM000108.) Section 13 governs only the method by which IBM was to notify its employees as to how IBM may use information, including NGSS Information, acquired or created during work under the JDA.

D. THE CONSTANT DELAY PARADIGM

39. At the 1995 International Conference on Computer-Aided Design ("ICCAD"), Joel Grodstein ("Grodstein"), Eric Lehman ("Lehman"), and other researchers from Digital Equipment Corporation ("DEC"), presented papers that proposed an approach for designing ICs, known as "constant delay." Under constant delay, the delay of a cell is maintained as constant during the IC design process and the size of the cell is varied. Constant delay is thus a "size-independent" method of designing ICs. (See Ex. 1095; Ex. 1096.)

40. The two papers proposing the constant delay approach were Grodstein,

Lehman, et al., "A Delay Model for Logic Synthesis of Continuously-Sized Networks," (see Ex. 1095), and a companion paper, Lehman, Grodstein, et al., "Logic Decomposition During Technology Mapping," (see Ex. 1096).

41. Under Grodstein's constant delay paradigm, delay would be held constant and cell size would vary as a linear function of the cell's output load. (See Ex. 1095; Tr. 1107:10-1108:2 (Friedman).)

42. Grodstein assumed continuous sizing of cells, whereby the cell library would include logic cells of whatever sizes were necessary to satisfy the delay constraints set for the IC. (See Ex. 1095.)

43. Grodstein's work also disclosed a method for setting an initial intended delay, known as the "Power x Delay" method, and provided experimental results using actual circuit designs. (See Ex. 1095; Tr. 1110:1-1111:12 (Friedman).)

44. Under the Power x Delay method, target delays are set by minimizing the product of Power times Delay. Minimizing this product is equivalent to maximizing "efficiency." (See Ex. 1095.)

45. By maximizing "efficiency," the Power x Delay method sets the target delay by determining the lowest delay achievable for the least amount of power that still meets the desired timing constraints for the IC. (See Ex. 1095.)

46. Grodstein's method of Power x Delay does not set delays based on gain (output capacitance divided by input capacitance). (See Ex. 1095; Tr. 1112:8-1113:25 (Friedman), 1170:16-1172:7 (Sarrafzadeh).)[2]

E. THE INVENTIONS: '446 AND '438 PATENTS

47. The specifications of the '446 and '438 Patents state: "According to the invention, the gate [i.e., cell] size is adjusted after cell placement based on changes in the capacitive load in order to maintain D [i.e., delay] as 'constant,' . . . ." (See Ex. 3 at 6:48-51; Ex. 1 at 6:49-52.)

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[2] The parties refer to the use of gain to set initial intended delays as "gain-based synthesis."

48. Every claim of the '446 and '438 Patents requires an "initial intended delay" or a "relative delay value." (See Ex. 3 at 17:14-22:28; Ex. 1 at 17:18-18:53.)

49. As construed by the Court, "initial intended delay" and "relative delay value" both mean a "delay set as a target," which is held constant unless it is revised at some point in the design process. (See Docket No. 392 at 32:8, 32:13, 10:1-10.)

50. The claims of the '446 and '438 Patents require a method to set the target delay and thereafter to calculate changes to the delay caused by changes in the load, which, in turn, will be accommodated by adjustments in cell size to maintain constant delay. These methods must be independent of cell size (which will vary during the process) and they must work in an automated system for designing ICs using arbitrary cells, as further required by the claims. (See Ex. 3; Ex. 1.)

F. IBM AND SYNOPSYS'S PREPARATION FOR JOINT ALLIANCE PROJECTS

51. In late 1995 and early 1996, IBM and Synopsys began preparing for the joint alliance work under the JDA.

52. Early in 1996, IBM and Synopsys began exploring possible EDA design methodologies, including logic synthesis techniques that would form the foundation of NGSS. (See Ex. 1123.)

53. Van Ginneken was assigned by Synopsys to work on constant delay as part of the NGSS project with IBM. (See Ex. 1136 at SY000045.)

54. Van Ginneken, who had attended Grodstein's presentation at the 1995 ICCAD, proposed that IBM and Synopsys pursue the constant delay concepts presented by Grodstein as a possible basis for NGSS. (See Ex. 1123.)

55. During a "meeting on NGSS" at Synopsys on January 30, 1996, and during a subsequent NGSS meeting on February 28, 1996, van Ginneken presented the constant delay concepts disclosed in Grodstein. (See Ex. 1123; Ex. 128 at SY008567.)

56. Although these two meetings were not attended by anyone from IBM, van Ginneken understood that these meetings were part of the "joint project with IBM" pursuant

to the JDA, and were held in anticipation of the joint IBM-Synopsys team's pursuit of EDA research. (See Ex. 1123; Ex. 128; Ex. 1661 (van Ginneken Decl.) ¶¶ 2-3.)

57. All of the work that van Ginneken performed at Synopsys relating to the constant delay paradigm and gain-based synthesis was part of the "joint project with IBM" under the JDA. (See Ex. 1661 ¶ 2; van Ginneken Dep. 92:16-21.)

58. The notes of the January 30, 1996 meeting contain only one reference to constant delay: "LVG/RR [Lukas van Ginneken/Richard Rudell]: Discussion on constant delay model." (See Ex. 1123 at SY013051.)

59. As of the end of January 1996, van Ginneken's ideas about constant delay came solely from the Grodstein and Lehman papers. (See Ex. 1123; Tr. 830:21-831:5 (Damiano).)

60. At the February 28, 1996 meeting, van Ginneken made another presentation on Grodstein's constant delay paradigm. (See Ex. 128 at SY008567; Tr. 937:4-21, 976:4-977:4 (Shenoy).)

61. There was no discussion of gain-based synthesis or the theory of logical effort during the February 28 meeting. (See Ex. 128 at SY008567; Tr. 937:22-938:7, 976:4-977:4 (Shenoy).) As discussed below, IBM engineer Prabhakar Kudva ("Kudva") introduced van Ginneken to the theory of logical effort after Kudva began working with van Ginneken in March 1996.

62. Shenoy of Synopsys attended the February 28 meeting and took handwritten notes. (See Ex. 128 at SY008567.) The notes indicate who attended the meeting, but do not list Synopsys's Richard Rudell ("Rudell") among the attendees. (See id.) The notes do not reflect any discussion of gain-based synthesis or the theory of logical effort.

63. Shenoy's notes reveal that van Ginneken, as he had done during the January 30 meeting, merely reiterated the constant delay concepts found in Grodstein. (See Ex. 128.)

64. Van Ginneken presented the Power.x Delay method of setting target delays set forth in Grodstein; Shenoy's notes contain a graph including the curved line of the

Power x Delay method. (See Ex. 128 SY008567; Tr. 976:11-977:4 (Shenoy); Ex. 1095 at 460, Fig. 4; Tr. 566:2-567:19 (Harris).).

65. Shenoy's notes do not contain a graph for gain-based delays, which would show a straight-line relationship because delay is linearly related to gain. (See Tr. 976:11-22 (Shenoy).) The February 28, 1996 meeting was the first time Shenoy was exposed to the general concept of constant delay. (See Tr. 969:11-15 (Shenoy).)

66. Van Ginneken did not use the word "gain" during the February 28, 1996 NGSS meeting. (See Tr. 834:13-836:24 (Damiano).)

G. VAN GINNEKEN'S RESEARCH AS OF FEBRUARY 29, 1996

67. On April 25, 1996, van Ginneken prepared an Invention Disclosure Form at Synopsys's request. (See Ex. 1152.) The Invention Disclosure Form, titled "Constant Delay Synthesis," states van Ginneken "conceived the idea" on February 29, 1996, which was before van Ginneken's collaboration with Kudva. (See Ex. 1152.) The Invention Disclosure Form further provides: "Constant delay synthesis is an entirely different paradigm for delay optimization in logic synthesis. It promises to radically simplify the design process from behavior synthesis down to physical desi[gn]. It is probably more of a philosophy th[an] an algorithm. . . . A major problem is that much of the basic idea can be found in two papers [the Grodstein work] published in the ICCAD of 95. However the scope of application of constant delay reaches far and wide, and we could patent many applications." (See Ex. 1152.)

68. The Invention Disclosure Form does not identify any method for setting target delays. It does not mention gain, gain-based synthesis, or initial intended delay. (See Ex. 1152; Tr. 606:16-21, 608:17-21 (Harris).)

H. THE EARLY MARCH 1996 IBM AND SYNOPSYS JOINT ALLIANCE MEETING

69. In early March 1996, IBM and Synopsys convened a joint alliance planning meeting. (See Tr. 838:3-15 (Damiano).)

70. At this meeting, van Ginneken made a slide presentation to IBM titled "Logic

Synthesis for Physical Design." The slide presentation detailed what van Ginneken knew about a number of EDA concepts, including Grodstein's constant delay paradigm. (See Ex. 1661 ¶ 4; Ex. 1155.)

71. In that presentation, the only slide discussing the selection of delays for isolated cells in a constant delay model was a slide describing Grodstein's Power x Delay method. (See Ex. 1155 at IBM001578.) As of the date of that presentation, van Ginneken had not conceived of an effective method for selecting and optimizing the delays of arbitrary cells, and, accordingly, presented only Grodstein's Power x Delay concept. (See Ex. 1661 ¶ 4; Ex. 1155; Kudva Dep. 200:2-10, 207:25-208:20.)

72. Van Ginneken's presentation also contained a slide, titled "Sizing of a Path," which discussed a method from Grodstein that does not involve the use of gain to calculate delay. (See Ex. 1155 at IBM001573.) This slide contained an equation from Glasser & Dobberpuhl's text book, The Design and Analysis of VLSI Circuits (1985) ("Glasser"), that Grodstein had referenced in his 1995 paper on constant delay. (See Ex. 1155; Ex. 1095; Ex. 1739 at 254.)

73. Grodstein cited to Glasser's equivalence 5.2. Grodstein states: "Any delay model must represent the relationship between cell area, load, and delay. A common model has the size of a gate being constant, and the gate's delay then varying linearly with output load. This model is intuitive and is accurate to a first order [9, pg. 254]." (See Ex. 1095 (brackets in original).) In Grodstein, reference 9 is Glasser. (See Ex. 1095.) Equivalence 5.2 is at page 254 of Glasser. (See Ex. 1739.)

74. Van Ginneken's early March 1996 presentation reproduces and expressly credits Glasser for equivalence 5.2, which appears on van Ginneken's "Sizing of a Path" slide, although van Ginneken incorrectly represents Glasser's equivalence relationship (≡) as an equality (=). (See Ex. 1155 at IBM001573; Ex. 1739 at 254.)

75. Glasser's equivalence 5.2 contains an unknown component, the parameter n_i, which is called the "fan-out parameter"; Glasser states that the fan-out parameter "has many distinct interpretations, depending on the problem being solved." (See Ex. 1739 at

254.)

76. Glasser's use of an equivalence relationship (≡) rather than an equality (=) suggests that the parameters are being left vague to permit the relationship to be refined further based on later research. (See Tr. 1204:7-20 (Sarrafzadeh).)

77. Van Ginneken's presentation of the Glasser equivalence 5.2 does not show a gain-based method for setting delays. To arrive at an equation where delay is based on gain using Glasser, one must perform a mathematical derivation of equivalence 5.2, and there is no evidence that van Ginneken performed this derivation by the time of his early March 1996 presentation. (See Tr. 638:22-639:4 (Harris).) Put another way, "you have to know what you are trying to get at in order to do [that] particular transformation[.]" (See Tr. 639:19-22 (Harris); see also Tr. 1202:8-24 (Sarrafzadeh).) Glasser does not teach a method for calculating delay in a size-independent fashion. (See Tr. 1202:25-1203:18 (Sarrafzadeh).)

78. Van Ginneken was familiar with the work of Mead and Conway, which analyzed gain and delay for a path of inverters. Inverters are a simple type of cell. Although van Ginneken had considered using gain to select the delay for a path of inverters, it was not clear to him how to generalize the use of gain to other types of logic cells. (See van Ginneken Dep. 47:20-48:15; Ex. 1155; Kudva Dep. 203:4-12.)

79. Before his collaboration with Kudva, van Ginneken had not determined whether there was any effective method to calculate initial delays for all cells in a circuit design, nor did van Ginneken understand how the theory of logical effort could be used to isolate the constituent elements of cell delay or that gain could be used to implement an effective, size-independent method to calculate the delays of the cells. (See Ex. 1661 ¶¶ 4-6; Ex. 1155; Kudva Dep. 37:21-38:25.)

I. KUDVA AND VAN GINNEKEN'S COLLABORATION ON RESEARCHING AND DEVELOPING CONSTANT DELAY AND GAIN-BASED SYNTHESIS

80. Shortly after van Ginneken's presentation to IBM, Kudva was assigned to work with van Ginneken on the constant delay paradigm as part of the NGSS project. (See

Ex. 1661 ¶¶ 5-7; van Ginneken Dep. 47:14-48:18, 131:6-132:20; Kudva Dep. 26:12-21, 35:8-17.)

81. Within a week of Kudva's assignment, Kudva and van Ginneken discussed the constant delay research as part of the NGSS project. (See van Ginneken Dep. 130:6-132:20; Kudva Dep. 26:12-27:12, 214:7-13.)

82. Van Ginneken informed Kudva that he "was looking for a way to assign initial constant delay" because he had not determined a method for selecting the delays of individual cells required by the constant delay approach, other than the Power x Delay method already taught by Grodstein. (See Kudva Dep. 37:25-38:25; van Ginneken Dep. 45:4-20, 48:7-22, 131:6-132:20.)

83. After considering the problem posed by van Ginneken, Kudva recognized that the 1991 paper by Sutherland & Sproull titled "Logical Effort: Designing for Speed on the Back of an Envelope" ("Sutherland") provided the answer that had eluded van Ginneken to date. (See Ex. 1085; van Ginneken Dep. 131:21-132:20; Kudva Dep. 37:25-39:25.)

84. After Kudva sent the Sutherland paper to van Ginneken, Kudva and van Ginneken had "extensive" discussions, during which Kudva "told [van Ginneken] that this [Sutherland] paper has a way of getting fixed gain values that is optimal." (See Kudva Dep. 39:11-16; van Ginneken Dep. 46:7-19.)

85. Kudva "appreciated the potential application of Sutherland's theory of logical effort to the constant delay paradigm," and "recognized that gain-based analysis could be applied to the constant delay paradigm and thus contributed to the concept of gain-based synthesis." (See Ex. 1661 ¶ 6.) The theory of logical effort articulated a delay model that provided a method for setting the target delay of arbitrary gates, regardless of the type of cell or the complexity of the integrated circuit. (See van Ginneken Dep. 42:22-45:20, 45:24-48:22, 54:1-5, 56:17-57:4, 185:1-22, 308:9-17; Kudva Dep. 26:22-27:12, 31:7-24, 38:18-25, 39:11-16, 200:15-19, 205:11-206:6.) The theory of logical effort also provided a method of measuring, i.e., modeling, delays in a size-independent fashion. (See Kudva Dep. 29:23-31:24, 205:11-206:6.)

86. Kudva introduced van Ginneken to the idea of using gain to assign initial constant delay.[3] (See Kudva Dep. 38:18-25; van Ginneken Dep. 45:4-20; Ex. 1661 ¶ 6.)

87. Unlike Grodstein's Power x Delay concept, the theory of logical effort separately analyzed the various components of delay, including electrical effort, i.e., gain, and logical effort. (See Kudva Dep. 16:7-17:22; Ex. 1155.) Kudva and van Ginneken demonstrated that Power x Delay was not a useful method for setting target delays because, among other reasons, it would lead to a gain of one for an inverter, a result that makes no sense. (See Tr. 1171:10-1172:7, 1175:13-1176:14 (Sarrafzadeh); Ex. 1195 at SY012226.)

88. The application of the theory of logical effort to the constant delay paradigm resulted in van Ginneken's and Kudva's joint work in gain-based synthesis, specifically, the application of gain-based modeling of cell delays to the constant delay paradigm. (See Ex. 1661 ¶ 6.)

89. Kudva made a crucial contribution to the gain-based synthesis inventions by discovering the "key insight to use a 'gain' based sizing strategy"; this insight "suddenly opened up a much wider field of application for CD [constant delay], and [made] it feasible to build a synthesis system around this strategy." (See Ex. 1293 at IBM005431; van Ginneken Dep. 46:7-47:3, 47:14-19, 56:17-57:4, 185:9-187:12, 308:9-17; Kudva Dep. 29:23-31:24, 39:11-16; Stok Dep. 114:18-115:8.)

90. Kudva saw the relationship between the constant delay model and the work of Sutherland and Sproull. He made that connection, and he sent van Ginneken a paper to alert him to that connection. (See van Ginneken Dep. 46:7-15.)

91. Van Ginneken and Kudva had extensive discussions about this connection.

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[3] The Court is unpersuaded by testimony from Synopsys's Robert Damiano ("Damiano"), Rudell, and Shenoy that van Ginneken discussed the use of gain to determine delay at meetings prior to the beginning of Kudva's collaboration, in March 1996, with van Ginneken. (See, e.g., Tr. 723:13-725:5 (Damiano), 887:7-888:17 (Rudell), 935:12-20 (Shenoy).) In light of the absence of references to such use of gain in Shenoy's notes of such meetings and in the minutes thereof, as well as the absence of any such reference in van Ginneken's invention disclosure, the Court finds Damiano, Rudell and Shenoy are mistaken as to the timing and/or content of any such discussions.

(See van Ginneken Dep. 46:16-19.)

92. Between March and May 1996, Kudva and van Ginneken collaborated on the development of software and a prototype to evaluate the effectiveness of gain-based synthesis. (See Ex. 1661 ¶ 7.)

93. On April 2, 1996, at an IBM-Synopsys joint alliance meeting, Kudva and van Ginneken were assigned to co-author a white paper setting forth their research and discoveries on constant delay. (See Ex. 1143 at IBM004351.)

J. VAN GINNEKEN AND KUDVA'S CO-AUTHORSHIP OF THE WHITE PAPER

94. As instructed, van Ginneken and Kudva co-authored a detailed white paper on their joint work, titled "The Constant Delay Methodology" ("White Paper"). (See Ex. 1163; van Ginneken Dep. 140:10-14; Kudva Dep. 33:7-22.)

95. To draft the White Paper, van Ginneken and Kudva engaged in an "iterative process" and exchanged multiple drafts. They commented on and made changes to each other's work. (See Kudva Dep. 36:7-11; 40:14-41:1, 50:8-22, 51:3-52:11; van Ginneken Dep. 140:10-23.)

96. The central importance of Kudva's contribution to the claimed inventions pervades the White Paper. (See Ex. 1163.)

a. Kudva contributed Sutherland's theory of logical effort as applied to constant delay, which is reflected in § 1.2 ("Logical Effort and Gain") of the White Paper. (See Ex. 1163 § 1.2 (at 3-4); Kudva Dep. 39:1-16, 40:1-13; Ex. 1661 ¶¶ 7-8.)

b. Kudva performed the experiments and wrote source code for the statistical wire load model, which is reflected in § 2 ("Methodology") of the White Paper. (See Ex. 1163 § 2 (at 5-9); Kudva Dep. at 42:22-45:16; Ex. 1661 ¶¶ 7-8; Ex. 1211.)

c. Kudva and van Ginneken collaborated on § 3.2 ("Transition Time Effects") of the White Paper. (See Ex. 1163 § 3.2 (at 11); Kudva Dep. 50:8-22.)

d. Kudva and van Ginneken collaborated on § 3.3 ("Library Design Recommendations") of the White Paper. (See Ex. 1163 § 3.3 (at 12-13); Kudva Dep.

50:8-50:22.)

e. Kudva and van Ginneken collaborated on §§ 4.1, 4.2, 4.3, 4.4, 4.5, and part of § 4.6 of the White Paper, all of which come under the title of "Constant Delay Synthesis." (See Ex. 1163 § 4 (at 13-18); Kudva Dep. 51:3-52:11; Ex. 1211.)

97. The theory of logical effort provided van Ginneken and Kudva with a method to set target delays and measure delays in a size-independent fashion. (See Tr. 1175:13-1177:22 (Sarrafzadeh).)

K. KUDVA'S CONTRIBUTIONS TO THE CONCEPTION OF THE INVENTIONS AS EXEMPLIFIED IN CLAIMS 49 AND 50 OF THE '446 PATENT

98. Kudva contributed to the conception of the claims in the '446 and '438 Patents. (See van Ginneken Dep. 184:11-187:12, 307:25-308:17; Trial Ex. 1661 ¶ 6; see also Tr. 1168:6-11, 1219:14-21 (Sarrafzadeh).)

99. Claim 49 of the '446 Patent claims:

> An automated method of modeling the delay of the cells of an integrated circuit comprising the steps of:
> associating an initial gain value with each cell that has been initially selected for inclusion in the integrated circuit;
> computing the initial intended delay value of each cell based on the initial intended gain value.

(See Ex. 3 at 22:1-7.)

100. Claim 49 requires that the target delay be set as a function of gain. This insight was contributed by Kudva. (See Tr. 1180:18-24, 1168:23-1169:1 (Sarrafzadeh).)

101. A gain-based method for computing delays for arbitrary cells – unlike methods such as Mead that are applicable only to inverters – satisfies claim 49's requirement that the method work for "each cell" in an "integrated circuit." (See Tr. 1181:3-23 (Sarrafzadeh).)

102. Claim 50, which is dependent on claim 49, recites "[t]he automated method of claim 49, wherein the initial intended gain value is determined such that the variation in the variable component of the initial intended delay is the same for all the cells in the circuit [and] is minimized." (See Ex. 3 at 22:8-11.)

103. The Sutherland paper, which was contributed by Kudva, provided an insight

that led directly to the invention described in claim 50. Under Sutherland's equation for the delay of a cell, $d = gh + p$, the stage effort (g times h) is the "variable component" of the delay, and parasitic delay, p, is constant. (See Tr. 1120:18-1121:23, 1122:11-1123:23 (Friedman); Ex. 1085 at 2, equation (4).) Sutherland states that the delay of a path of cells will be minimized when each stage on the path has the same minimized or "optimal" stage effort, which is logical effort (g) multiplied by electrical effort (h). (See Ex. 1085 at 6; Tr. 1120:18-1121:23 (Friedman), 1178:3-1179:12 (Sarrafzadeh); van Ginneken Dep. 43:1-20.)

104. The specification for the '446 and '438 Patents stresses the importance of the theory of logical effort to the claimed inventions. The specification cites to Sutherland, and applies the theory of logical effort to gain-based synthesis. (See, e.g., Ex. 3 at 2:57-65, 7:12-28.)

105. Additionally, during the prosecution history of the '446 patent, the applicant asserted in response to an Office Action that "the claimed invention can be characterized as a gain-based delay model." (See Ex. 4 (Response to Office Action (Oct. 26, 2000) at 7.) The prosecution history also demonstrates that the ability to calculate delay for cells other than buffers (chains of inverters) was necessary for the patentability of the claimed invention. During prosecution of the '446 patent, the examiner rejected as obvious claim 43 (which ultimately issued as claim 49), stating that Doreswamy (U.S. Patent No. 5,798,935) computed the initial intended delay for buffers based on initial intended gain. (See Ex. 4 (Office Action (June 8, 2000)) ¶¶ 6 and 21 and n. 3.) In response, the applicant argued: "Not only are cells that are not buffers necessarily selected by the claim 43 method, but there logically cannot be any concept of the recited initial gain value of each selected cell when one is providing a 'collection of buffer types' as taught in claim 1 of Doreswamy." (See Ex. 4 (Response to Office Action (Oct. 26, 2000)) at 6-7 (emphasis in original).) In the following office action, the examiner indicated that claim 43 contained allowable subject matter. (See Ex. 4 (Office Action (Jan. 18, 2001)) ¶ 23.)

L. STEPS TAKEN BY SYNOPSYS TOWARD PATENTING THE INVENTIONS DEVELOPED BY VAN GINNEKEN AND KUDVA; VAN GINNEKEN'S SUBMISSION OF PAPER WITHOUT CREDITING KUDVA

106. In the spring of 1996, Synopsys decided to begin the process of drafting patent applications for the gain-based synthesis inventions developed by van Ginneken and Kudva. (See van Ginneken Dep. 75:4-17, 76:4-24.)

107. Synopsys asked van Ginneken to prepare patent applications claiming the constant delay and gain-based synthesis inventions. (See van Ginneken Dep. 75:4-17, 76:4-24; Ex. 1152; Ex. 1198.)

108. At the same time that he was working on the draft patent applications for the gain-based synthesis inventions that he and Kudva had developed, van Ginneken was preparing for publication a paper containing the same concepts, titled "Driving on the Left-Hand Side of the Performance Speedway" ("Driving Paper"). (See Ex. 1195.)

109. The Driving Paper reflects the centrality of Kudva's contribution of the theory of logical effort, stating: "This paper applies . . . the concept of 'logical effort' to logic synthesis. The concept of logical effort is used to motivate the constant delay model for logic synthesis, and to determine appropriate constant delays for library cells. The paper proposes area analysis and optimization methods based on 'electrical effort' or gain." (See Ex. 1195 at SY012221.)

110. Synopsys did not disclose to Kudva or IBM either its preparation of the draft patent applications or its preparation of the Driving Paper. (See Kudva Dep. 137:14-138:3; 166:16-23.)

111. The Driving Paper copied significant portions from the White Paper, including portions contributed by Kudva. (See Kudva Dep. 143:5-146:11; Tr. 622:2-624:4, 627:18-629:4, 629:15-631:2 (Harris).)

112. The majority of the ideas in the Driving Paper reflected work on which Kudva and van Ginneken had collaborated. (See Kudva Dep. 145:17-146:11.)

113. The following sections of the Driving Paper included material on which Kudva and van Ginneken had collaborated: §§ 1 ("Introduction"), 2 ("Logical Effort"), 3 ("Constant Delay Synthesis"), 4 ("Mapping for Delay"), 7 ("Discrete Sizing Algorithms"), 8 ("Library Analysis"), and 10 ("Cell Generators"). (See Kudva Dep. 143:5-146:11.)

114. Additionally, portions of §§ 5 ("Area Estimation"), 6 ("Area Optimization"), and 9 ("Accuracy") of the Driving Paper, as well as the "Open Problems" section and "Conclusion," included material on which Kudva and van Ginneken had collaborated. (See Kudva Dep. 143:5-146:11.)

115. In the late summer of 1996, van Ginneken submitted the Driving Paper to Professor Ralph Otten ("Otten") for publication at the November 1996 ICCAD. (See Tr. 755:17-20 (Damiano).)

116. In September 1996, a description of the Driving Paper was published in the Advance Program for the 1996 ICCAD. (See Ex. 1797.)

117. Like the Driving Paper itself, the Advance Program underscored the centrality of the theory of logical effort, which Kudva had contributed, to the inventions. The Advance Program stated: "We extend Sutherland & Sproull's theory of logical effort and apply it to logic synthesis. In this context, we review the mapping algorithm of Eric Lehman et al. and Grodstein's delay model for continuously sized networks." (See Ex. 1797.)

118. Both IBM and Synopsys considered the research conducted by van Ginneken and Kudva under the JDA, and, in particular, their development of gain-based synthesis, to be jointly owned.

a. Members of the IBM NGSS team, including Kudva, were upset when they saw the description in the Advance Program because it failed to credit Kudva as co-author and contributor and threatened to expose sensitive proprietary information to competitors. (See Ex. 1202; Kudva Dep. 139:3-12, 145:17-146:11.)

b. Kudva's supervisor, Leon Stok ("Stok"), objected to Damiano about Synopsys's proposed publication of the Driving Paper and, in particular, to the "explicit mention to apply the 'logical effort' work to logic synthesis," on the ground Kudva contributed that concept to the White Paper, and the White Paper constituted joint IBM and Synopsys confidential information. (See Exs. 1202, 1204.) Stok suggested revising the Driving Paper to replace the theory of logical effort with the equation from Glasser, for the reason that Glasser did not teach how to use gain to select the delays of arbitrary cells.

(See Ex. 1204.)

c. In response to IBM's protests, Synopsys ordered van Ginneken to withdraw the Driving Paper from publication to avoid "giving away confidential information to our competitors." (See Tr. 851:21-25 (Damiano); van Ginneken Dep. 86:12-87:9.)

d. Van Ginneken called Kudva to apologize for the controversy surrounding the submission of the Driving Paper to ICCAD. (See Kudva Dep. 154:13-155:2.)

e. Because of the controversy surrounding van Ginneken's proposed presentation of the Driving Paper at the 1996 ICCAD, Synopsys stopped work on drafting patent applications with respect to any aspects of van Ginneken's constant delay research. (See van Ginneken Dep. 76:4-24.)

f. Synopsys saw little commercial value in joint patents, in part because of concerns that, under the JDA, IBM's participation would be required to enforce the patents against Synopsys's EDA competitors and that IBM would have the right to license the joint patents to any company without accounting to Synopsys. (See O'Connor Dep. 93:5-94:15, 103:18-105:5, 105:9-13, 109:11-110:3; van Ginneken Dep. 75:4-17, 76:4-17; Ex. 1352 at IBM002905-2906.)

M. DEVELOPMENT AND TESTING OF SYNZILLA

119. At a three-day workshop held from June 25 through June 27, 1996 in Yorktown, New York, the joint IBM-Synopsys NGSS group met and agreed to develop a synthesis system based on the constant delay paradigm and concept of gain-based synthesis described in the van Ginneken-Kudva White Paper. (See Ex. 1169; Ex. 1176; Ex. 1179; Drumm Dep. 139:7-140:1.) The parties gave the project the code-name Synzilla. (See Tr. 741:15-23, 743:17-744:8, 819:20-820:11, 823:2-14 (Damiano).)

120. For the next year the NGSS team, composed of IBM and Synopsys engineers, collaborated in the writing of source code for Synzilla, and ultimately produced a prototype. (See O'Connor Dep. 141:16-143:10.)

121. In May 1997, van Ginneken resigned from Synopsys. (See Tr. 854:2-4

(Damiano).)

122. As of May 1997, Synzilla was only a prototype, and, as set forth in the "IBM Synopsys R&D Alliance Update" dated May 6, 1997, "essential functions" in the following areas needed to be created: anchor code, library analysis, timing, placement, optimization, timing driven optimization, technology mapping, and timing correction. (See Ex. 143 at SNP000178.)

123. In mid-1997, Synopsys and IBM conducted experiments using Synzilla to determine whether or not constant delay synthesis was a viable technology; the results of these tests were presented at a July 16, 1997 IBM-Synopsys Joint R&D Alliance meeting ("Alliance Meeting"). (See Ex. 1428.) The testing focused solely on synthesis, and did not include placement or routing. (See Tr. 774:20-776:9 (Damiano), 853:7-13 (Shenoy).)

124. The inventions in the '446 and '438 Patents were not jointly reduced to practice before van Ginneken resigned from Synopsys in May 1997. (See Ex. 144 Tab 4 (Magma's Supplemental Responses to Synopsys's First Set of Requests for Admissions) at Request for Admission Nos. 8, 12.)

125. There was no fundamental change to the logic synthesis portion of Synzilla after May 1997, when van Ginneken resigned from Synopsys, and before the July 1997 Alliance Meeting with IBM. (See Tr. 775:11-14 (Damiano).) Similarly, although IBM and Synopsys engineers continued to revise the Synzilla code after van Ginneken left Synopsys in May 1997, (see Ex. 1659-2), no significant new function was added to Synzilla between May 1997 and the July 1997 Alliance Meeting. (See Tr. 854:1-855:18 (Damiano).)

126. After the above-referenced testing was completed, Shenoy led an effort at Synopsys to test the integration of placement and synthesis in Synzilla. (See Tr. 941:24-942:19, 943:7-20 (Shenoy).) Synopsys ran the tests using sample designs provided by Intel. (See Tr. 777:9-16 (Damiano), 943:4-13 (Shenoy).) No IBM personnel participated in these tests. (See Tr. 792:21-793:13 (Damiano); 942:11-15, 942:20-943:3, 955:25-956:2 (Shenoy); Hieter Dep. at 52:5-53:10, 75:1-76:2, 83:2-14.)

127. The Synzilla experiments on the Intel test cases were conducted using a

number of different methodologies. (See Tr. 943:21-946:24 (Shenoy).) Some of the experiments included gain-based synthesis, but others did not. (See Tr. 943:21-946:7 (Shenoy); Ex. 129 at SY008861.) The test results alone do not indicate whether a particular experiment included gain-based synthesis, or whether the test performed each element of the patent claims. (See Tr. 545:25-547:11 (Harris); 946:8-24, 953:15-954:18 (Shenoy); Exs. 1504, 1520.)

128. Both Synopsys and Intel considered the Synzilla experiments to be a failure. (See Tr. 786:8-11 (Damiano); 947:17-948:15, 952:21-953:11 (Shenoy); O'Hara Dep. 79:11-81:8.)

N. SYNZILLA'S ROUGH PLACER

129. Synzilla included a "rough placer" that would establish initial locations for the cells and compute the wire length between the cells. (See Damiano Dep. 248:17-249:3; Ex. 1615; Ex. 1659-2.)

130. IBM engineer Anthony Drumm ("Drumm") contributed code for a wire load estimator used in the rough placer; Drumm's software estimated the length of wires connecting cells together, and was used in Synzilla to size the cells. (See Drumm Dep. 139:15-140:25, 142:5-16.)

131. Synopsys engineer Shenoy worked with the NGSS team on the rough placer and incorporated Drumm's code into the rough placer. (See Tr. 971:20-972:9 (Shenoy).)

132. Drumm's code "operated and worked with Synzilla." (See Drumm Dep. 142:5-16.)

O. VAN GINNEKEN'S ASSIGNMENT OF INVENTIONS TO SYNOPSYS

133. On May 17, 1995, van Ginneken signed a Proprietary Information and Inventions Agreement ("Agreement") as a condition to his employment with Synopsys. (See Ex. 26 ¶ 2 and Ex. 98.) The Agreement provides, inter alia, that "Proprietary Information" created, discovered, or developed by van Ginneken during his employment with Synopsys is the sole property of Synopsys. (See Ex. 98 ¶ 3A.) The Agreement defines "Proprietary Information" to include, inter alia, trade secrets, processes, know-how,

computer software, improvements, and inventions. (See id. ¶ 1.) The Agreement further provides that any rights van Ginneken may have or acquire in any "Inventions" are assigned to Synopsys. (See id. ¶ 3D.) The Agreement defines "Inventions" to include "all improvements, inventions, works of authorship, processes, techniques, know-how, formulae, data, ideas and other information . . . whether or not patentable, made or conceived or reduced to practice or learned" by van Ginneken during the term of his employment, either alone or jointly with others. (See id. ¶ 3C.)

134. Van Ginneken never objected to the scope of the terms of the Agreement or asked Synopsys for any waiver from the enforcement of its provisions. (See Ex. 26 ¶ 7.)

135. When signing the Agreement, van Ginneken provided a list to Synopsys of the inventions to which he had contributed prior to his employment with Synopsys, and represented to Synopsys that the list was complete. (See Ex. 26 ¶ 4; Ex. 98 at SY000007-9.) None of the inventions claimed in the '446 or '438 patents is included in the list of prior inventions van Ginneken provided to Synopsys. (See Ex. 26 ¶ 5.)

P. KUDVA'S ASSIGNMENT OF INVENTIONS TO IBM

136. On January 17, 1996, Kudva signed an "Agreement Regarding Confidential Information and Intellectual Property" with IBM. (See Ex. 1121.) Said agreement provides, inter alia: "I hereby assign to IBM my entire right, title and interest in any idea, concept, technique, invention, design, (whether the design is ornamental or otherwise), computer programs and related documentation, other works of authorship, mask works and the like (all hereinafter called "Developments"), hereafter made, conceived, written or otherwise created solely or jointly by me, whether or not such Developments are patentable, subject to copyright protection or susceptible to any other form of protection which: (a) relate to the actual or anticipated business or research or development of IBM or its subsidiaries, or (b) are suggested by or result from any task assigned to me or work performed by me or on behalf of IBM or its subsidiaries." (See Ex. 1121 ¶ 4.) Kudva stated in said agreement that he had no previously conceived Developments that he wished to exclude from the agreement. (See id. ¶ 7.)

Q. VAN GINNEKEN'S EMPLOYMENT AT MAGMA; MAGMA'S FILING OF PATENT APPLICATIONS IDENTIFYING VAN GINNEKEN AS SOLE INVENTOR

137. In May 1997, while IBM and Synopsys were still operating under the JDA, van Ginneken resigned from Synopsys in order to join Magma. (See Ex. 26 ¶ 28.)

138. On December 24, 1997, Magma filed a provisional patent application with the PTO, which eventually led to the issuance of the '446 and '438 patents. (See Ex. 133.)

139. During prosecution of the '446 and '438 patents, Magma consistently represented to the PTO that van Ginneken was the sole inventor of the patents. (See, e.g., Ex. 2 at 5, Ex. 4 at 5.)

140. Without van Ginneken's direct involvement, Magma also filed patent applications for van Ginneken's asserted inventions in other foreign patent offices around the world. (See van Ginneken Dep. 315:11-316:2.) The foreign patent applications are: Japan Patent Application No. JP20000526885T, Israel Patent Application No. IL136709D, Canada Patent Application No. CA2317538, European Patent Application No. EP1040435, and International Patent Application No. WO9934310. (See Exs. 14-17, 125.) During prosecution of these foreign patent applications, Magma consistently represented that van Ginneken was the sole inventor of the inventions claimed therein. (See Exs. 14-17, 125.)

141. On September 17, 2002, the PTO issued the '446 patent to Magma. (See Ex. 3.) Van Ginneken is listed as the sole inventor of the '446 patent. (See id.) The inventions claimed in the '446 patent are the same inventions conceived by van Ginneken and Kudva while van Ginneken was employed at Synopsys. (See Ex. 26 ¶ 44; Ex. 144 (Magma's Supplemental Response to First Set of Requests for Admissions) at RFA 5 and 6.)

142. On April 20, 2004, the PTO issued the '438 patent to Magma. (See Ex. 1.) Van Ginneken is listed as the sole inventor of the '438 patent. (See id.) The inventions claimed in the '438 patent are the same inventions conceived by van Ginneken and Kudva while van Ginneken was employed at Synopsys. (See Ex. 26 ¶ 45; Ex. 144 (Magma's Supplemental Response to First Set of Requests for Admissions) at RFA 9 and 10.)

143. On April 19, 2004, Magma filed United States Patent Application No.

10/828,547, which is a continuation of, inter alia, the applications that issued as the '446 and '438 patents. (See Ex. 20.) The application lists van Ginneken as the sole inventor of the inventions claimed in Application No. 10/828,547. (See id., last page.)

144. On multiple occasions after the filing of the instant action on September 17, 2004, Magma filed documents with the PTO identifying van Ginneken as the sole inventor of the inventions claimed in the '446 and '438 patents. (See Exs. 19, 28, 78.) Such representations to the PTO occurred after Magma took the position, in discovery responses herein, that van Ginneken was not the sole inventor of the inventions claimed in the '446 and '438 patents. (See Exs. 1837, 1840.) Magma additionally submitted to the PTO, however, the pleadings in the instant litigation, which set forth the parties' dispute over the inventorship and ownership of the '446 and '438 patents. (See Exs. 22, 25.)

145. On October 6, 2005, Magma filed two additional patent applications, United States Patent Applications Nos. 11/245,530 and 11/246,451, both of which applications claim priority from the December 1997 provisional application. (See Exs. 77 and 78.) Although said applications identify van Ginneken as the sole inventor of the claimed inventions, Magma expressly stated in each application: "This continuation application has been filed to maintain the status quo in view of the dispute over inventorship and ownership that is currently being litigated between Magma and Synopsys. The filing of this continuation application is not a representation that the applications identify the correct inventors[.]" (See Ex. 77 at 28; Ex. 78 at 28.)

CONCLUSIONS OF LAW

A. BURDENS OF PROOF

"Because a patent is presumed valid under 35 U.S.C. § 282, there follows a presumption that the named inventors on a patent are the true and only inventors." Gemstar-TV Guide International, Inc. v. International Trade Commission, 383 F.3d 1352, 1381 (Fed. Cir. 2004). A challenge to the inventorship of a patent must be proven by clear and convincing evidence. See id. at 1382 ("Alleged co-inventors must establish their co-inventorship by facts supported by clear and convincing evidence."); Eli Lilly and Company

v. Aradigm Corp., 376 F.3d 1352, 1358 (Fed. Cir. 2004) ("The general rule is that a party alleging misjoinder or non-joinder of inventors must meet the heavy burden of proving its case by clear and convincing evidence.").

There is no such heightened burden imposed on challenges to patent ownership. "It is elementary that inventorship and ownership are separate issues." Beech Aircraft Corp. v. EDO Corp., 990 F.2d 1237, 1248 (Fed. Cir. 1993). Inventorship "is a question of who actually invented the subject matter claimed in a patent," while ownership "is a question of who owns legal title to the subject matter claimed in a patent[.]" See id. Unlike inventorship, which is an issue of federal law, see The University of Colorado Foundation, Inc. v. American Cyanamid Co., 196 F.3d 1366, 1372 (Fed. Cir. 1999), "the question of who owns the patent rights and on what terms typically is a question exclusively for state courts." See Jim Arnold Corp. v. Hydrotech Systems, Inc., 109 F.3d 1567, 1572 (Fed. Cir. 1997); see also Regents of the University of New Mexico v. Knight, 321 F.3d 1111, 1118 (Fed. Cir. 2003) ("State law governs contractual obligations and transfers of property rights, including those relating to patents."). The parties have cited no case, and the Court has located none, holding that a party challenging patent ownership must prove its claim by clear and convincing evidence. See, e.g., id. at 1121 (affirming district court's determination of ownership of patents under New Mexico law; no mention of "clear and convincing evidence" standard).

Synopsys argues that it is the owner of the '446 and '438 patents because van Ginneken, the named inventor of those patents, invented the subject inventions while he worked at Synopsys. Synopsys thus is challenging only ownership, not inventorship, of said patents, and the Court finds Synopsys must prove its claim of ownership of the '446 and '438 patents by a preponderance of the evidence.[4]

Magma argues that IBM is a co-owner of the '446 and '438 patents, under both the JDA and under patent law, on the ground that Kudva is a co-inventor of the inventions set

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[4] Synopsys is owner of record of the '114 patent; to the extent Magma contends otherwise, Magma bears the burden of proof.

forth therein. Magma further argues that IBM is a co-owner of the '446, '438, and '114 patents under the JDA on the ground that IBM and Synopsys jointly reduced to practice the inventions set forth therein.

The JDA, by its terms, is governed by New York law, see JDA § 12.2; contract claims under New York law must be proven by a preponderance of the evidence. See Enercomp, Inc. v. McCorhill Publishing, Inc., 873 F.2d 536, 542 (2d Cir. 1989). As discussed below, however, the JDA incorporates patent law on the issues of joint conception and reduction to practice. Because "[c]onception is the touchstone of inventorship" under patent law, see Burroughs Wellcome Co. v. Barr Laboratories, Inc., 40 F.3d 1223, 1227 (Fed. Cir. 1994), Magma's challenge to the ownership of any of the subject patents, to the extent such challenge is based on a theory of joint conception, is, in essence, a challenge to inventorship and, consequently, must be proven by clear and convincing evidence. By contrast, reduction to practice is not an element of inventorship under patent law. See Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1465 (Fed. Cir. 1998) (noting "legal distinction between conception (which justifies a finding of inventorship) and reduction to practice (which does not)"). Consequently, Magma's challenge to the ownership of any of the subject patents, to the extent such challenge is based on a theory of joint reduction to practice, is not a challenge to inventorship but, rather, a challenge based solely on the contract, and, thus, must be proven only by a preponderance of the evidence.

B. INTERPRETATION OF JDA

As noted, Magma argues IBM is a co-owner of the '446, '438, and '114 patents pursuant to the JDA.

1. Standing to Assert IBM's Rights Under JDA

In a footnote in its post-trial memorandum,[5] Synopsys argues Magma is precluded from seeking to establish IBM's rights to the patents under the JDA because Magma has

[5] Synopsys expands on the argument in its proposed findings of fact and conclusions of law. (See Synopsys's Revised Findings at 25-26.)

no enforceable rights under the JDA as a third party beneficiary, and because an accused infringer cannot assert the equitable ownership rights of a third party as a defense to a claim of infringement.

As Synopsys notes, under New York law, which applies to the JDA, (see JDA § 12.2), "a contract is to be enforced only by those who are parties to it and by those who are its direct beneficiaries" and "before a stranger can avail himself of the exceptional privilege of suing for breach of an agreement, to which he is not a party, he must, at least show that it was intended for his direct benefit." See Ogden Development Corp. v. Federal Insurance Co., 508 F.2d 583, 588 (2d Cir. 1974). Here, however, Magma does not assert a cause of action against Synopsys for breach of the JDA. Rather, in response to Synopsys's claims of infringement, Magma asserts affirmative defenses and counterclaims based on the argument that IBM has licensed Magma to practice the patents. (See TAC Answer ¶¶ 150, 156, 163, 197-98, 211-215, 232-236, 251-255.) Proof of a license to practice a patent is an affirmative defense to a claim of patent infringement. See The Carborundum Co. v. Molten Metal Equipment Innovations, Inc., 72 F.3d 872, 878 (Fed. Cir. 1995).

In order to demonstrate the validity and applicability of any such license, an issue that is not yet before the Court, Magma first must prove that IBM has ownership rights in the patents. It is black letter law that only a patent owner may license a patent. See, e.g., 35 U.S.C. § 154(a)(1) ("Every patent shall contain . . . a grant to the patentee, his heirs or assigns, of the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States"); Lans v. Digital Equipment Corp., 252 F.3d 1320, 1327 (Fed. Cir. 2001) ("[O]nly the patentee has authority to grant licenses[.]").

Synopsys cites no authority precluding an accused infringer from attempting to prove the validity of an asserted license by reference to an agreement between the party alleging infringement and the asserted licensor. Mercantile National Bank of Chicago v. Howmet Corp., 524 F.2d 1031 (7th Cir. 1975), upon which Synopsys relies, is distinguishable. In that case, the defendant argued that the patent at issue was unenforceable because one of

the joint inventors breached an equitable duty to assign his interest in the patent to a third party. See id. at 1034. The Seventh Circuit rejected the defense, noting "[i]t has long been settled that a third party's equitable rights in a patent may not be asserted as a defense in an action for infringement brought by the owner of title to the patent." See id.; see also Dorr-Oliver, Inc. v. Comanco, Inc., 432 F.2d 447, 450 (Ct. Cl. 1970) ("In patent litigation between private parties, equitable rights of ownership of strangers to the suit cannot be raised as defenses against the legal titleholder of a patent."). Here, by contrast, Magma does not seek to defeat Synopsys's claim of patent infringement on the ground that Synopsys has breached a duty to IBM; rather, Magma argues that Magma itself has rights in the patents as a result of the asserted license from IBM. Magma is not precluded from asserting such a defense. See, e.g., Schering Corp. v. Zeneca Inc., 104 F.3d 341 (Fed. Cir. 1997) (affirming summary judgment in favor of defendant in infringement suit brought by one patent owner because defendant proved it had license from co-owner of patent).

Accordingly, the Court finds Magma is not barred from attempting to prove IBM has ownership rights in the patents pursuant to the JDA.

2. Legal Standard re: Contract Interpretation

The JDA, by express provision, is "governed by the laws of the State of New York." (See Ex. 1120 § 12.2.) Under New York law, "[t]he fundamental, neutral precept of contract interpretation is that agreements are construed in accord with the parties' intent." See Greenfield v. Philles Records, Inc., 98 N.Y.2d 562, 569 (2002). "The best evidence of what parties to a written agreement intend is what they say in their writing." Id. (internal quotation and citation omitted). "Thus, a written agreement that is complete, clear and unambiguous on its face must be enforced according to the plain meaning of its terms." Id.

"Extrinsic evidence of the parties' intent may be considered only if the agreement is ambiguous[.]" Id. "[I]f the agreement on its face is reasonably susceptible of only one meaning, a court is not free to alter the contract to reflect its personal notions of fairness and equity." Id. at 569-70. "[E]xtrinsic and parol evidence is not admissible to create an ambiguity in a written agreement which is complete and clear and unambiguous on its

face." W.W.W. Associates, Inc. v. Giancontieri, 77 N.Y.2d 157, 163 (1990).

"Words in a contract are to be construed to achieve the apparent purpose of the parties." Hooper Associates, Ltd. v. AGS Computers, Inc., 74 N.Y.2d 487, 491 (1989). Indeed, when the "purpose sought to be accomplished" is ascertained, "it will take precedence over all other canons of construction." See In re Herzog, 301 N.Y. 127, 135 (1950).

3. Joint Ownership of Inventions Jointly Conceived or Jointly Reduced to Practice as Part of Collaboration under JDA

As set forth below, the JDA distinguishes inventions developed solely by one party in the performance of the JDA from inventions that resulted from the parties' collaborative efforts under the JDA. The JDA defines "Invention" as:

> any discovery or improvement, conceived or first reduced to practice during the term of this Agreement in the performance of this Agreement, solely or jointly by one or more employees of Synopsys, or solely or jointly by one or more employees of IBM.

(See Ex. 1120 § 1.24). Pursuant to the JDA, a "Joint Invention" is "an Invention conceived or first reduced to practice by one or more employees of one party jointly with one or more employees of the other party." (See id. § 1.25.)

The JDA contains separate provisions distinguishing (1) the ownership of Inventions and Joint Inventions from (2) the ownership of Joint Products and NGSS. (See id. §§ 4.1.2.1, 4.1.2.2.) The ownership of Inventions and Joint Inventions is governed by § 4.1.2.1, which provides that "[a]ny Invention made by one party shall be owned by that party," and "[a]ny Joint Invention shall be jointly owned." (See Ex. 1120 § 4.1.2.1.) Joint Products are to be owned jointly. (See Ex. 1120 § 4.1.2.2.) NGSS is to be solely owned by Synopsys, but licensed to IBM for its internal use. (See Ex. 1120 §§ 4.1.2.2, 4.5.)

The Court previously has found the language of § 4.1.2.1 to be ambiguous in light of § 4.1.2, which is in the form of a preface to § 4.1.2.1, and states, in its entirety, "As to the

Joint Products and NGSS:".[6] In light of § 4.1.2, the JDA contains an ambiguity as to whether § 4.1.2.1 applies only to Inventions and Joint Inventions that are incorporated into Joint Products and NGSS, or whether it applies to all Inventions and Joint Inventions created in the course of the parties' work in developing Joint Products and NGSS. The Court now resolves that ambiguity.

The purpose of the JDA was to "jointly develop new EDA tools," including the Joint Products and NGSS. (See Ex. 1120 at 1 ¶ A and § 2.1.) Camposano, the only member of the JDA negotiating team who testified at trial, testified that a concern of both parties was how to protect their individual intellectual property while still encouraging the development of joint work. (See, e.g., Tr. 996:10-24 (Camposano).) The parties to the JDA sought "to enable [the parties] to both contribute to the joint work but not be encumbered to do whatever other work [they] were doing at the time, and, also, not to hinder people to actually freely contribute to the joint products that they were to develop." (See id. at 996:20-24.) The parties sought, in drafting the JDA, to discourage each other from "trying to hide any discovery that [they] would do during the joint work or not contributing work that was necessary . . . to actually enable the products that [they] were developing." (See id. at 996:25-997:10.) Camposano testified that the JDA addressed these concerns in the following manner: "The essential guiding principle was that whatever IP, whatever intellectual property belonged to any of the parties before entering the JDA would continue to belong to that party. Whatever discovery was made during the JDA by one of the parties alone would continue to belong to that party, and the only intellectual property that would be owned jointly was the one that went into the products and that was developed jointly." (See Tr. 997:12-15 (Camposano); see also Tr. 997:15-998:7, 1002:1-3 (Camposano).)

Camposano's testimony that the parties would jointly own only Joint Inventions that "went into the products" leaves an unusual gap in the ownership provisions of the JDA that

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[6] In the Court's March 30, 2006 summary judgment order, the Court found "an issue of material fact exists as to whether the joint patent provision applies only to inventions incorporated in 'Joint Products' or 'NGSS.'" (See Docket No. 994 at 13.)

fails to further the JDA's purpose of encouraging those who worked on the JDA to contribute all necessary information to the development of the Joint Products and NGSS. Under Camposano's construction, the JDA, while providing for ownership of (1) pre-existing intellectual property, (2) intellectual property developed separately from the product development activities of the JDA, and (3) inventions incorporated into products, (see Ex. 1120 § § 4.1.1, 4.1.2.1), would contain no provision for the ownership of Inventions or Joint Inventions that ultimately were not incorporated into a product. Neither Synopsys, IBM, nor any of its inventors working on the development of the Joint Products or NGSS would know at the time of invention, however, whether any invention ultimately would be incorporated into a product. Consequently, Camposano's construction of the JDA would create precisely the type of confusion as to ownership of new inventions that the JDA was intended to avoid.[7] Accordingly, the Court does not credit Camposano's testimony that § 4.1.2.1 was intended to apply only to Inventions and Joint Inventions incorporated into Joint Products or NGSS.

The Court finds the only way to interpret § 4.1.2, i.e., the phrase "As to the Joint Products and NGSS," in accordance with the purposes of the JDA is to construe it as if it were worded "As to Intellectual Property Developed Pursuant to the JDA's Product Development Activities," as distinguished from the "intellectual property developed separate from the product development activities of [the JDA]," which is the subject of § 4.1.1.[8] Under such construction, the JDA provides for ownership of all intellectual property developed in the course of the parties' joint development activities, as well as all intellectual property developed separately therefrom. Specifically, pursuant to § 4.1.1, each party's pre-existing intellectual property, as well as any intellectual property thereafter developed by that party separately from the product development activities of the JDA, are owned by

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[7] The Court notes that Camposano was not asked how ownership of Inventions and Joint Inventions created during the parties' development activities, but not actually incorporated into a product, would be determined.

[8] The absence of a corresponding preface to § 4.1.1 is not significant, as the JDA would hardly be described as a model for the practice of outlining.

that party; pursuant to § 4.1.2, Inventions and Joint Inventions arising out of the product development activities of the JDA are owned by the party or parties who made them, any Joint Products ultimately created are jointly owned by the parties, and NGSS is owned by Synopsys. Such construction also is consistent with the JDA's definition of Invention, which includes "any discovery or improvement, conceived or first reduced to practice during the term of [the JDA] in the performance of [the JDA]." (See Ex. 1120 § 1.24) (emphasis added)).

Accordingly, the Court finds § 4.1.2.1 addresses the ownership of Inventions and Joint Inventions created or reduced to practice in furtherance of the JDA's product development activities, and is not limited to Inventions that ultimately are incorporated into Joint Products or NGSS; consequently, Joint Inventions are jointly owned by IBM and Synopsys regardless of whether the Joint Inventions are so incorporated. (See Ex. 1120 § 4.1.2.1.)

4. Effect of Dissolution Agreement on IBM's Joint Ownership of Joint Inventions.

As the Court previously has noted, the Dissolution Agreement "incorporates the terms of § 4 of the JDA, except as expressly modified." (See Amended Order Denying Motions for Summary Judgment Re: Patent Ownership (Docket No. 994) ("SJ Order") 14:5-7; see also Ex. 1120 at IBM000098.) Because the Dissolution Agreement did not modify § 4.1.2.1, (see Ex. 1120 at IBM000098), the provision of the JDA that addresses ownership of Inventions and Joint Inventions, the parties retain co-ownership of any Joint Invention conceived or reduced to practice as part of the JDA's product development activities.

Although the Dissolution Agreement contains limitations on the use of NGSS Information[9] by both IBM and Synopsys, it does not purport to transfer the ownership of any

[9] As noted, the JDA defines "NGSS Information" as "Information generated by the Joint Development Team relating to any specific result of the parties' partial or completed development work, relating to NGSS," including, but "not limited to, any tool specification, design Information, Code, Documentation, specification, or quality or reliability Information for any NGSS." (See Ex. 1120 § 1.32.) "Information" includes "information in visual, oral,

Joint Inventions relating to NGSS. In particular, pursuant to § 4.23 of the Dissolution Agreement, Synopsys granted IBM a ten-year license to "all of Synopsys's rights in NGSS Information" for IBM's internal use and "for use in the design, development, analysis, support or manufacture of semiconductor or integrated circuit products to be fabricated by IBM or any IBM Subsidiary for any of their customers." (See Ex. 1120 at IBM00102-03.) Synopsys further granted IBM a license, beginning ten years after the dissolution date, to use "all of Synopsys's rights in NGSS Information" for any purpose. (See Ex. 1120 at IBM00103.) Synopsys agreed, pursuant to the Dissolution Agreement, that it would "not further develop NGSS . . . or distribute NGSS Information . . . to any third party." (See Ex. 1120 at IBM00104.) Nothing in the Dissolution Agreement purports to transfer ownership of any Joint Invention under the JDA.

Section 13 of the Dissolution Agreement obligates IBM to inform its employees "of the restrictions on IBM's use of . . . NGSS Information" acquired during the term of the JDA. (See Ex. 1120 at IBM000108.) In other words, § 13 governs only the method by which IBM was to notify its employees as to how IBM may use information, including NGSS Information, acquired or created during work performed under the JDA. Neither the language of § 13 of the Dissolution Agreement, nor any provision of the JDA itself, terminates IBM's ownership rights in Joint Inventions conceived or reduced to practice as part of the JDA's product development activities.

Accordingly, the Court finds the Dissolution Agreement did not terminate IBM's ownership rights in any Joint Invention conceived or reduced to practice as part of the JDA's product development activities.

5. Conception and Reduction to Practice Under JDA

Pursuant to the JDA, a Joint Invention is "any discovery or improvement, conceived

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written or other tangible form" that the parties may disclose to one another, or that may be created by one or both parties, pursuant to the JDA. (See Ex. 1120 § 1.23.) Although NGSS Information includes certain work product arising from the parties' joint activities, the JDA's definition of NGSS Information does not address, limit, or modify the ownership of Inventions and Joint Inventions arising out of the development of NGSS. Ownership of Inventions and Joint Inventions is addressed separately in § 4.1.2.1 of the JDA.

or first reduced to practice during the term of [the JDA] in the performance" of the JDA "by one or more employees of one party jointly with one or more employees of the other party." (See Ex. 1120 §§ 1.24, 1.25 (emphasis added).) Thus, any "discovery or improvement" that is jointly conceived is jointly owned, regardless of whether it is reduced to practice. The parties dispute whether the JDA incorporates the patent law standard for conception or whether it sets forth a separate standard for conception.

The JDA's definition of "Invention" as "any discovery or improvement," (see Ex. 1120 § 1.24), uses the identical words as are used to define an invention under patent law. See 35 U.S.C. § 100(a) (defining "invention" as "invention or discovery"); 35 U.S.C. § 101 (providing "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor . . . ."). Under patent law, "[c]onception is the touchstone of inventorship[.]" See Burroughs Wellcome, 40 F.3d at 1227.

Under New York law, the law applicable to the interpretation of the JDA, a contract is interpreted by reference to "the reasonable expectation and purpose of the ordinary business[person], in the factual context in which terms of art and understanding are used[.]" See Uribe v. Merchants Bank of New York, 91 N.Y.2d 336, 341 (1998) (internal quotation and citation omitted; alteration in original). Here, in light of the JDA's express provision for potential "patents issued" on the parties' "Joint Inventions," (see Ex. 1120 § 4.1.2.1), the parties reasonably could expect that terms common to patent law and used in the JDA, such as "invention," "discovery," "improvement" "conceive," and "reduction to practice" were to be understood in accordance with their meaning under patent law. Additionally, under New York law, "[t]echnical words in a contract must be taken in a technical sense unless the context of the instrument or a usage which is applicable clearly indicates a different meaning." See Nau v. Vulcan Rail & Construction Co., 286 N.Y. 188, 198 (1941) (holding contract's reference to "infringement" suits did not encompass interference proceedings because "the words and expressions 'infringement,' 'infringement suits,' 'interference' and 'interference proceedings' are words and expressions of art and have a definite, technical

and well-understood meaning . . . [and] [b]oth parties . . . knew the difference in meaning"); see also Kabushiki Kaisha Hattori Seiko v. Refac Technology Development Corp., 690 F. Supp. 1339, 1341, 1343 (S.D.N.Y. 1988) (looking to definition of "scope" as "established in patent law," for purposes of interpreting license to make products "within the scope of" certain patents).[10] Nothing in the JDA, and no other evidence cited by the parties, suggests that the parties intended to define "conception" and "reduction to practice" of an invention other than by reference to the meaning of those terms under patent law.

Accordingly, the Court will apply patent law in determining whether Synopsys and IBM jointly conceived and/or jointly reduced to practice any of the inventions claimed in the patents.

C. JUDICIAL ESTOPPEL

Before turning to the issue of joint conception, the Court first addresses Synopsys's argument that Magma is judicially estopped from asserting that Kudva is a co-inventor of the '446 and '438 patents because Magma obtained issuance of those patents by representing to the PTO that van Ginneken was the sole inventor thereof, and continued to make such representations in further proceedings before the PTO, a position that is contrary to the position Magma took at trial.

Judicial estoppel is "an equitable doctrine invoked by a court at its discretion" where necessary "to prevent improper use of judicial machinery." See New Hampshire v. Maine, 532 U.S. 742, 750 (2001) (internal quotations and citations omitted). "[A]bsent any good explanation, a party should not be allowed to gain an advantage by litigation on one theory, and then seek an inconsistent advantage by pursuing an incompatible theory." Id. at 749

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[10] American Telephone and Telegraph Co. v. Integrated Network Corp., 972 F.2d 1321 (Fed. Cir. 1992), upon which Magma relies, is distinguishable. In that case, the issue was whether state law claims based on an employee's breach of an agreement to assign inventions to his employer presented a question of patent law sufficient to confer federal jurisdiction. See id. at 1322. The Federal Circuit held that the meaning of the phrase "inventions . . . conceived," in the agreement there at issue, was not necessarily a question of patent law, and that the state court of New Jersey should "decide what state law has to say about [the] contract." See id. at 1324. Here, by contrast, jurisdiction is not the issue and, in any event, under New York law, as discussed above, the term "conceived" must be interpreted by reference to patent law.

(internal quotation and citation omitted). Several factors typically inform a court's decision as to whether to apply the doctrine of judicial estoppel:

> First, a party's later position must be clearly inconsistent with its earlier position. Second, courts regularly inquire whether the party has succeeded in persuading a court to accept that party's earlier position, so that judicial acceptance of an inconsistent position in a later proceeding would create the perception that either the first or the second court was misled. Absent success in a prior proceeding, a party's later inconsistent position introduces no risk of inconsistent court determinations, and thus poses little threat to judicial integrity. A third consideration is whether the party seeking to assert an inconsistent position would derive an unfair advantage or impose an unfair detriment on the opposing party if not estopped.

Id. at 750-51 (internal quotations and citations omitted). The above-referenced factors are not exclusive; "[a]dditional considerations may inform the doctrine's application in specific factual contexts." See id. at 751.

Ninth Circuit, rather than Federal Circuit, law governs the Court's application of judicial estoppel. See Lampi Corp. v. American Power Products, Inc., 228 F.3d 1365, 1377 (Fed. Cir. 2000). Under Ninth Circuit authority, judicial estoppel is invoked "not only to prevent a party from gaining an advantage by taking inconsistent positions, but also because of general considerations of the orderly administration of justice and regard for the dignity of judicial proceedings, and to protect against a litigant playing fast and loose with the courts." See Hamilton v. State Farm Fire & Casualty Co., 270 F.3d 778, 782 (9th Cir. 2001) (internal quotation and citation omitted). Judicial estoppel is to be applied only in instances of "knowing misrepresentation to or . . . fraud on the court." See Johnson v. Oregon Dep't of Human Res., Rehab. Div., 141 F.3d 1361, 1369 (9th Cir. 1998). "If incompatible positions are based not on chicanery, but only on inadvertence or mistake, judicial estoppel does not apply." Id.

1. Application to Statements to PTO

Magma raises a question as to whether judicial estoppel is applicable where the prior statements have been made to the PTO rather than a court. The Ninth Circuit has held, however, that although the doctrine of judicial estoppel "is often articulated as applying to 'judicial' proceedings," the doctrine is also applicable where "the prior

proceeding was administrative rather than judicial." See Rissetto v. Plumbers and Steamfitters Local 343, 94 F.3d 597, 604 (9th Cir. 1996) (applying judicial estoppel where prior statement was made in workers' compensation proceeding).[11] Moreover, the Federal Circuit, applying similar Seventh Circuit law, has discussed the doctrine of judicial estoppel in the context of a party's prior inconsistent statements to the PTO, without expressing any concerns about the applicability of the doctrine to such statements. See Lampi, 228 F.3d at 1377 (stating "we are troubled by the inconsistencies between [plaintiff's] statements to the PTO . . . and the position taken by [plainitff] in this litigation," but ultimately affirming decision not to apply judicial estoppel where district court found inconsistencies were inadvertent).

Accordingly, the Court finds the doctrine of judicial estoppel is applicable to cases in which the prior statements at issue were made to the PTO.

2. New Hampshire v. Maine Factors

The Court next turns to the New Hampshire v. Maine factors and, for the reasons set forth below, finds the doctrine of judicial estoppel is not applicable herein.

With respect to the first factor, it cannot be disputed that Magma's statements to the PTO are inconsistent with its position in the instant litigation; Magma repeatedly represented to the PTO that van Ginneken was the sole inventor of the inventions claimed in the '446 and '438 patents, while in the instant litigation Magma contends that van Ginneken and Kudva were co-inventors thereof. With respect to the second factor, it cannot be disputed that Magma was successful in obtaining acceptance of its former position, in that it obtained issuance of the '446 and '438 patents as a result of its assertion

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[11] The Court has not considered Magma's citation to Devon Industries, Inc. v. American Medical Int'l, Inc., 65 F.3d 910 (9th Cir. 1995), an unpublished Ninth Circuit decision. "Unpublished dispositions and orders" of the Ninth Circuit "are not binding precedent," and "may not be cited to or by the courts of [the Ninth] [C]ircuit," except in circumstances not applicable here. See 9th Cir. R. 36-3. Newly-adopted Federal Rule of Appellate Procedure 32.1 is inapplicable to unpublished decisions issued prior to January 1, 2007. In any event, Devon predates Rissetto, and, consequently, its finding that judicial estoppel is limited to judicial proceedings is contrary to binding precedent.

that van Ginneken was the sole inventor.[12]

With respect to the third factor, however, Synopsys has not shown that Magma would "derive an unfair advantage or impose an unfair detriment on [Synopsys] if not estopped." See New Hampshire v. Maine, 532 U.S. at 751. Judicial estoppel "precludes a party from gaining an advantage by taking one position, and then seeking a second advantage by taking an incompatible position." See Rissetto, 94 F.3d at 600 (applying judicial estoppel where plaintiff therein obtained workers' compensation benefits based on inability to work, then sued employer for age discrimination and argued she was able to perform her job). Magma, by contrast, has abandoned its prior claim that it owns the '446 and '438 patents, and has not disputed Synopsys's contention that all of van Ginneken's inventive acts with respect to the '446 and '438 patents occurred during the time van Ginneken was employed at Synopsys. Consequently, Magma is not seeking to obtain a "second advantage" as a result of its current position; rather, it is giving up the advantage it obtained as a result of its prior position.

Moreover, Magma, by doing so, is not imposing an "unfair detriment" on Synopsys. Magma's abandonment of any claim of ownership in the '446 and '438 patents works to the benefit of Synopsys. Although Magma also contends Kudva is a co-inventor, such contention imposes no "unfair" detriment on Synopsys, as Synopsys is not entitled to sole ownership where Kudva in fact is a co-inventor.

Under the circumstances of the instant case, the Court finds Magma's change in position with respect to inventorship poses no "threat to judicial integrity," see id. at 750, and that neither the New Hampshire v. Maine factors nor any other factors weigh in favor of application of judicial estoppel. Accordingly, the Court finds Magma is not judicially

[12] With respect to the continuation applications, no patents have issued thereon; consequently, Magma has not obtained a benefit as a result of its representations as to sole inventorship in connection with those applications.

estopped from asserting that Kudva is a co-inventor of the '446 and '438 patents.[13]

D. CONCEPTION

Magma argues that IBM is a co-owner of the '446 and '438 patents because van Ginneken and Kudva jointly conceived, and, thus, were co-inventors of, the inventions set forth therein.[14]

Under patent law, joint conception occurs where "each inventor . . . contribute[s] to the joint arrival at a definite and permanent idea of the invention as it will be used in practice." See Burroughs Wellcome, 40 F.3d at 1229; see also id. at 1228 (defining "conception" as "the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice") (internal quotation and citation omitted). "An idea is definite and permanent when the inventor has a specific, settled idea, a particular solution to the problem at hand, not just a general goal or research plan he hopes to pursue." Id. at 1228. "Conception is complete only when the idea is so clearly defined in the inventor's mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation." Id. "[A]n inventor need not know that his invention will work for conception to be complete[,]" however. See id. "He need only show that he had the idea; the discovery that an invention actually works is part of its reduction to practice." Id.

Persons may be "joint" inventors even though "(1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim of the patent." See 35 U.S.C. § 116. By enacting the above-quoted language, "Congress intended to clarify the law of joint inventorship by codifying the principles stated in Monsanto [Co. v. Kamp, 269 F. Supp. 818 (D.D.C. 1967)]." See Kimberly-Clark Corp. v.

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[13] In light of this ruling, the Court does not reach Magma's argument that Synopsys is barred, under the doctrine of unclean hands, from asserting judicial estoppel against Magma.

[14] Magma does not challenge the inventorship of the '114 patent.

Procter & Gamble Distributing Co., Inc., 973 F.2d 911, 916 (Fed. Cir. 1992). In Monsanto, the court held that a "joint invention is the product of collaboration of the inventive endeavors of two or more persons working toward the same end and producing an invention by their aggregate efforts." See Kimberly-Clark, 973 F.2d at 916 (quoting Monsanto, 269 F. Supp. at 824) (emphases deleted).

"It is not necessary that the entire inventive concept should occur to each of the joint inventors[.]" Id. (quoting Monsanto, 269 F. Supp. at 824). "The fact that each of the inventors plays a different role and that the contribution of one may not be as great as that of another does not detract from the fact that the invention is joint if each makes some original contribution, though partial, to the final solution of the problem." Id. (quoting Monsanto, 269 F. Supp. at 824). For example, "[o]ne may do more of the experimental work while the other makes suggestions from time to time." See id. Indeed, there is "no explicit lower limit on the quantum or quality of inventive contribution required for a person to qualify as a joint inventor." See Fina Oil & Chem. Co. v. Ewen, 123 F.3d 1466, 1473 (Fed. Cir. 1997). The law requires only that "an individual must make a contribution to the conception of the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention." See id.

The requisite contribution may be the identification of other work, for example, "one inventor seeing a relevant report and building upon it." See Kimberly-Clark, 973 F.2d at 917. On the other hand, "a person will not be a co-inventor if he or she does no more than explain to the real inventors concepts that are well known and the current state of the art." See Fina Oil, 123 F.3d at 1473.

"Because co-inventors need not make a contribution to the subject matter of every claim of the patent, inventorship is determined on a claim-by-claim basis." See Trovan, Ltd. v. Sokyumat SA, Irori, 299 F.3d 1292, 1302 (Fed. Cir. 2002) (internal quotation and citation omitted). A "contribution to one claim is enough" to establish joint inventorship for the entire patent. See Ethicon, 135 F.3d at 1460. Thus, "an inventorship analysis, like an infringement or invalidity analysis, begins as a first step with a construction of each

asserted claim to determine the subject matter encompassed thereby." See Trovan, 299 F.3d at 1302. "The second step is then to compare the alleged contributions of each asserted co-inventor with the subject matter of the properly construed claim[.]" Id.

1. Joint Conception of Inventions Set Forth in '446 and '438 Patents Based on Kudva's Contribution of Methods for Setting and Calculating Delays in Size-Independent Manner

Each claim of the '446 and '438 Patents requires that cells have an "initial intended delay" or an associated "relative delay value," both of which terms, as noted, have been construed by the Court as a "delay set as a target." (See Docket No. 392 at 32:7, 32:13.) The Court's construction requires the target delay to be held constant unless it is revised at some point in the design process. (See id. at 10:1-25.) Accordingly, conception of the "complete and operative invention, as it is hereafter to be applied in practice," see Burroughs Wellcome, 40 F.3d at 1228, requires a method to set the target delay and thereafter to calculate changes to the delay caused by changes in the load, which, in turn, will be accommodated by adjustments in cell size to maintain the target delay. Before collaborating with Kudva, van Ginneken did not have a method for setting target delays for arbitrary cells and measuring changes in delay resulting from changes in load. Kudva's contribution of Sutherland's theory of logical effort and a gain-based model for setting and measuring delays provided this method.

Before collaborating with Kudva, van Ginneken possessed merely a "philosophy," (see Ex. 1152), and had not arrived at a definite and permanent idea of the invention as it would be used in practice. Such "philosophy" falls short of the standard for conception. "The conception analysis necessarily turns on the inventor's ability to describe his invention with particularity." Burroughs Wellcome, 40 F.3d at 1228. "Until he can do so, he cannot prove possession of the complete mental picture of the invention." Id.

As set forth in the Court's findings of fact, the operative methods for setting and measuring delays arose out of van Ginneken's joint work with Kudva from early March 1996 until the May 1996 completion of the White Paper. At the time Kudva and van Ginneken began collaborating, van Ginneken was looking for a way to assign and model

delays. Kudva offered the theory of logical effort and explained how it provided an operative method for assigning the delays in a size-independent fashion. Contrary to Synopsys's argument, Kudva did more than merely contribute "concepts that are well known and the current state of the art," see Fina Oil, 123 F.3d at 1473. Rather, as noted, Kudva recognized that the theory of logical effort, as set forth in the Sutherland paper, could be applied to the theory of constant delay and introduced van Ginneken to the idea of using gain to assign initial delays. As the Federal Circuit has observed, "[t]he genius of invention is often a combination of known elements which in hindsight seems ordained." See McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351 (Fed. Cir. 2001).

As further noted, Van Ginneken and Kudva jointly authored the White Paper, which applies the theory of logical effort as a size-independent method for setting target delays and measuring delays for arbitrary cells. (See Ex. 1163.) The White Paper provides the first complete description of the inventions claimed in the '446 and '438 patents. (See id.) Indeed, it was the White Paper that described those inventions, for the first time, with the "particularity" required to satisfy the test for conception. See Burroughs Wellcome, 40 F.3d at 1228. As the White Paper demonstrates, the theory of logical effort provided the "particular solution" that enabled van Ginneken and Kudva to solve the "problem at hand." See Burroughs Wellcome, 40 F.3d at 1228; see also Tr. 1175:13-1177:22 (Sarrafzadeh). The collaboration between van Ginneken and Kudva resulted in "the joint arrival at a definite and permanent idea of the invention as it will be used in practice." See Burroughs Wellcome, 40 F.3d at 1229-30.

The evidence that Kudva provided the theory of logical effort and a gain-based model for setting and measuring delays demonstrates, not only by a preponderance of the evidence, but also by clear and convincing evidence, that Kudva is a joint inventor with van Ginneken with respect to all of the claims of the '446 and '438 Patents.

2. Joint Ownership of '446 and '438 Patents by IBM and Synopsys as Result of Kudva and van Ginneken's Joint Conception of Inventions Claimed therein

"[I]n the context of joint inventorship, each co-inventor presumptively owns a pro rata

undivided interest in the entire patent, no matter what their respective contributions." Ethicon, 135 F.3d at 1465. Such presumption of co-ownership may be rebutted, however, by proof that an inventor's ownership interests were assigned to another party. See, e.g., Teets v. Chromalloy Gas Turbine Corp., 83 F.3d 403, 407 (Fed. Cir. 1996). Consequently, Kudva and van Ginneken, as co-inventors of the '446 and '438 Patents, are presumed to be co-owners of those patents, in the absence of any evidence that they assigned those interests.

Here, as noted, Kudva assigned to IBM all inventions he conceived in connection with his employment, (see Ex, 1121), and van Ginneken assigned to Synopsys all inventions he conceived in connection with his employment, (see Ex. 98). Magma has neither argued nor submitted evidence that van Ginneken conceived of any of the inventions set forth in the '446 or '438 patents during the time he worked at Magma, or that any other Magma employee participated in the conception of the inventions set forth in the '446 and '438 patents.

Accordingly, the Court finds IBM and Synopsys are co-owners of the '446 and '438 Patents as a result of Kudva's and van Ginneken's joint conception of the inventions claimed therein.

E. REDUCTION TO PRACTICE

Although, as set forth above, Magma has established that IBM and Synopsys are co-owners of the '446 and '438 patents, based on joint conception by Kudva and van Ginneken, the Court will address Magma's additional argument that IBM and Synopsys are co-owners of the '446 and '438 patents, as well as the '114 patent, because IBM and Synopsys jointly reduced to practice the inventions set forth therein.

Under the JDA, a party is entitled to joint ownership of "any discovery or improvement, conceived or first reduced to practice by one or more employees of one party jointly with one or more employees of the other party." (See Ex. 1120 § 1.25 (emphasis added).)

Under patent law, "[a] reduction to practice can be either a constructive reduction to

practice, which occurs when a patent application is filed, or an actual reduction to practice." See Cooper v. Goldfarb, 154 F.3d 1321, 1327 (Fed. Cir. 1998). There is no evidence that Synopsys and IBM intended that one party unilaterally could obtain sole ownership rights in an invention the parties were jointly working to reduce to practice, merely by unilaterally filing a patent application prior to actual reduction to practice. Accordingly, the Court finds joint reduction to practice, within the meaning of the JDA, does not include the concept of constructive reduction to practice.

To prove actual reduction to practice, a party must show that the inventor (1) "constructed an embodiment or performed a process that met all the limitations of the claim," and (2) "determined that the invention would work for its intended purpose." See Slip Track Systems, Inc. v. Metal-Lite, Inc., 304 F.3d 1256, 1265 (Fed. Cir. 2002). The first part of the test is similar to the test for infringement. See, e.g., Research Plastics, Inc. v. Federal Packaging Corp., 421 F.3d 1290, 1297 (Fed. Cir. 2005) ("Literal infringement requires that the accused device embody each limitation of the asserted claim. The absence of any limitation of the asserted claim defeats literal infringement"); Eaton v. Evans, 204 F.3d 1094, 1097 (Fed. Cir. 2000) ("[T]here can be no actual reduction to practice if the constructed embodiment or performed process lacks an element recited in the [claim] or uses an equivalent of that element."). "[T]ypically expert testimony will be necessary in cases involving complex technology." See Centricut, LLC v. The Esab Group, Inc., 390 F.3d 1361, 1370 (Fed. Cir. 2005) (discussing infringement).

With respect to the second part of the above-referenced test, the intended purpose of the invention ordinarily will be determined by reference to the language of the claim. See, e.g., Griffin v. Bertina, 285 F.3d 1029, 1033-34 (Fed. Cir. 2002); Manning v. Paradis, 296 F.3d 1098, 1102 (Fed. Cir. 2002). A determination that the invention would work for that purpose, however, does "not require that the invention, when tested, be in a commercially satisfactory stage of development." See Scott v. Finney, 34 F.3d 1058, 1061 (Fed. Cir. 1994) (internal quotation and citation omitted). Rather, reduction to practice requires "only a reasonable showing that the invention will work to overcome the problem it

addresses." See id. at 1063. "The adequacy of a reduction to practice is to be tested by what one of ordinary skill in the art would conclude from the results of the tests." See Slip Track, 304 F.3d at 1265 (internal quotation and citation omitted). "Testing need not show utility beyond a possibility of failure, but only utility beyond a probability of failure." Scott, 34 F.3d at 1062.

The inventor must "contemporaneously appreciate that the embodiment worked," however, and that it "met all the limitations" of the claim. See Cooper, 154 F.3d at 1327. "[R]eduction to practice does not occur until an inventor, or perhaps his agent, knows that the invention will work for its intended purpose." See Estee Lauder v. L'Oreal, S.A., 129 F.3d 588, 593 (Fed. Cir. 1997). Moreover, "a party cannot obviate the initial requirement that a constructed embodiment include every element of the [claim] through evidence that the embodiment worked for its intended purpose, regardless of the quality of the evidence." See Eaton, 204 F.3d at 1098.

1. Claim Limitations

Magma's arguments in support of joint reduction to practice rely entirely on the creation and testing of Synzilla.[15] Although Magma presented no expert testimony that, when the testing of Synzilla was conducted, Synzilla met the limitations of any of the patents' claims, Magma argues it had no need to present such evidence because Synopsys admitted, in the Rule 30(b)(6) deposition of Damiano, that Synzilla met the limitations of all of the claims of each of the three patents.

At that deposition, Damiano, Synopsys's Rule 30(b)(6) designee on the subject of Synzilla, (see Tr. 812:12-18 (Damiano)), testified that he "believe[d]" Synzilla "practiced" claim 1 of the '446 patent, using the term "practice" to mean Synzilla satisfied all the limitations of that claim. (See Damiano Dep. 247:2-249:21; see also Tr. 792:4-12

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[15] Magma has admitted in responses to requests for admission that the inventions were not reduced to practice before van Ginneken resigned from Synopsys. Those responses preclude Magma from contending that the inventions were jointly reduced to practice by Synopsys and IBM before van Ginneken resigned from Synopsys. See Fed. R. Civ. P. 36(b); see also Amended Order Denying Motions for Summary Judgment re: Patent Ownership, filed March 30, 2006, at 17.

(Damiano).) Damiano further testified that Synzilla "practiced" claim 1 of the '438 patent. (See Damiano Dep. 249:22-250:14.)

Contrary to Magma's argument, testimony by a Rule 30(b)(6) designee is not a binding admission on the designating corporation, but, rather, is "evidence which, like any other deposition testimony, can be contradicted." See A.I. Credit Corp. v. Legion Ins. Co., 265 F.3d 630, 637 (7th Cir. 2001). Here, however, Synopsys submits no evidence contradicting Damiano's admissions, but, rather, argues only that Magma has failed to meet its burden of proof. Because Damiano, Synopsys's Rule 30(b)(6) designee, admitted that Synzilla practiced claim 1 of the '446 patent and claim 1 of the '438 patent, and the admission is uncontradicted, the Court finds Magma has satisfied its burden of demonstrating that Synzilla met all the limitations of those claims.

With respect to the '114 patent, however, Magma points to no similar statement by Damiano, and has cited no other evidence to that effect. Accordingly, the Court finds Magma has not demonstrated that Synzilla met the limitations of any claim of the '114 patent.[16]

2. Contemporaneous Appreciation

The parties dispute the precise intended purposes of the inventions set forth in the patents. The Court need not decide the issue, however, because regardless of the intended purposes of the inventions, and even assuming, arguendo, Synzilla in fact worked for such purposes, the evidence clearly demonstrates there was no contemporaneous appreciation that any intended purpose had been achieved. See Cooper, 154 F.3d at 1327; see also Estee Lauder, 129 F.3d at 593. Shenoy described the Synzilla test results as "extremely frustrating" and "very, very disappointing," to the point that Synopsys "gave up on the gain-based sizing." (See Tr. 947:19-24, 952:23-953:8 (Shenoy).) Intel's Randy O'Hara similarly testified that the test results did not meet Intel's expectations and that Intel decided not to "move forward" with Synzilla. (See O'Hara Dep. 80:7-81:8.) Magma has pointed to no

[16] For this reason alone, Magma's argument that Synopsys and IBM jointly reduced to practice the inventions set forth in the '114 patent fails.

evidence suggesting that IBM was of a different opinion.

Accordingly, as Magma has not demonstrated that Synopsys and IBM had a contemporaneous appreciation that the inventions incorporated into Synzilla worked for their intended purposes, Magma has failed to establish reduction to practice, much less joint reduction to practice, of the inventions set forth in the '446, '438, and '114 patents.

F. APPLICATION OF RICHARDSON v. SUZUKI

The Court rejects Synopsys's argument that Richardson v. Suzuki Motor Co., Ltd., 868 F.2d 1226 (Fed. Cir. 1989) requires assignment of the '446 and '438 patents only to Synopsys regardless of any interest IBM may have in those patents. In Richardson, a jury found the defendant, Suzuki, fraudulently obtained a patent ("the Tamaki patent") on an invention misappropriated from the inventors, specifically, plaintiff Richardson and non-party Cazort. See id. at 1249. The district court, on the ground that Richardson was not the sole inventor, denied Richardson's post-trial motion to reassign the Tamaki patent to Richardson. See id. The Federal Circuit reversed, stating that "[t]o hold otherwise would ratify and indeed reward the wrongdoing," and that "[b]ased on the jury verdict, Richardson [was] entitled to ownership of the patents as against Suzuki." See id. Consequently, even though Cazort was a co-inventor of the patents, the Federal Circuit ordered reassignment of the patents to Richardson. See id.

Richardson does not bar assignment from Magma to both Synopsys and IBM. Richardson never addressed the question of whether an assignment could have been made to both Richardson and Cazort, had the district court been asked to do so and an adequate record of joint ownership been made.[17] Moreover, Magma, unlike Suzuki, is not claiming an interest in the patents. Accordingly, even if Magma initially engaged in wrongdoing, an issue this Court has not reached, assigning the patents to both Synopsys and IBM will not "ratify and . . . reward [that] wrongdoing," but rather will ensure that the patents are restored to the proper owners.

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[17] The jury apparently found Richardson and Cazort were joint inventors, but made no finding as to joint ownership. See id.

G. CONTINUATION PATENT APPLICATIONS AND FOREIGN PATENT APPLICATIONS

Although the parties stipulated that the trial would determine the issue of ownership of the continuation patent applications and foreign patent applications, (see Docket 986 at 2), the parties have spent little time discussing those applications in their post-trial briefs.[18] Three continuation applications have been identified. On April 19, 2004, Magma filed United States Patent Application No. 10/828,547, which is a continuation of, inter alia, the applications that issued as the '446 and '438 patents. (See Ex. 20.) The application lists van Ginneken as the sole inventor of the claimed inventions. (See id., last page.) On October 6, 2005, Magma filed two additional patent applications, United States Patent Applications Nos. 11/245,530 and 11/246,451, both of which applications are continuations of, inter alia, the applications that issued as the '438 and '446 patents. (See Exs. 77 and 78.) Magma also filed, in foreign patent offices, the following patent applications for van Ginneken's asserted inventions: Japan Patent Application No. JP20000526885T, Israel Patent Application No. IL136709D, Canada Patent Application No. CA2317538, European Patent Application No. EP1040435, and International Patent Application No. WO9934310. (See van Ginneken Dep. 315:11-316:2; see Exs. 14-17, 125.)

As a matter of law, "a 'continuation' application claims the same invention claimed in an earlier application, although there may be some variation in the scope of the subject matter claimed." See Transco Products Inc. v. Performance Contracting Inc., 38 F.3d 551, 555 (Fed. Cir. 1994); see also John Gladstone Mills III et al., 3 Patent Law Fundamentals § 15.8 (2006) ("The disclosure contained in the continuation must be the same as that of the original application, that is, the continuation should not include anything which would constitute new matter if inserted in the original application."). Because all three of the continuation applications are based on the applications that issued as the '446 and '438 patents, and the Court has determined that Synopsys and IBM are co-owners of the '446

[18] Magma presented no argument with respect to the above-referenced patent applications in its post-trial briefing; Synopsys's argument on the issue consists of one paragraph.

and '438 patents by reason of van Ginneken's and Kudva's co-invention of the inventions claimed therein, and as neither party contends that the ownership of the continuation applications should differ from that of the '446 and '438 patents,[19] the Court finds Synopsys and IBM are co-owners of the continuation applications.

With respect to the foreign patent applications, neither party has submitted any evidence as to their ownership. In its initial post-trial memorandum, however, Synopsys states that "Magma's foreign counterpart applications contain the same inventions as the '446 and '438 patents." (See Synopsys's Post-Trial Brief at 39 n.3.) Magma, in its post-trial memoranda, does not take issue with this statement. Accordingly, as the Court has determined that Synopsys and IBM are co-owners of the '446 and '438 patents, and as neither party contends ownership of the foreign patent applications differs from that of the '446 and '438 patents, the Court finds Synopsys and IBM are co-owners of the foreign patent applications as well.

CONCLUSION

For the reasons set forth above, the Court finds:

1. Synopsys and IBM are co-owners of the '446 patent.

2. Synopsys and IBM are co-owners of the '438 patent.

3. Synopsys is the sole owner of the '114 patent.

4. Synopsys and IBM are co-owners of the following continuation applications: United States Patent Applications Nos. 10/828,547, 11/245,530 and 11/246,451.

5. Synopsys and IBM are co-owners of the following foreign patent applications: Japan Patent Application No. JP20000526885T, Israel Patent Application No. IL136709D, Canada Patent Application No. CA2317538, European Patent Application No. EP1040435, and International Patent Application No. WO9934310.

6. Magma shall take forthwith all necessary steps to transfer to Synopsys and IBM

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[19] The Court notes that each continuation application includes one or more claims requiring either "choosing a target delay," (see Ex. 77 at 21:3, Ex. 78 at 36:3), or using cells with "an associated relative delay value," (see Ex. 20 at 60:3-5.) As discussed above, Kudva contributed the method for selecting the desired delay associated with each cell.

United States Patent Applications Nos. 10/828,547, 11/245,530 and 11/246,451, Japan Patent Application No. JP20000526885T, Israel Patent Application No. IL136709D, Canada Patent Application No. CA2317538, European Patent Application No. EP1040435, and International Patent Application No. WO9934310. As Magma, in connection with its recently-filed motion to stay, has submitted evidence that it has transferred title to the '446 and '438 patents to Synopsys, in compliance with the Court's January 3, 2007 order granting Synopsys's motion for preliminary injunction, Synopsys shall take all necessary steps to add IBM as a joint owner of record.

Accordingly:

1. As to Magma's Second Counterclaim, by which Magma seeks a declaration that IBM is a joint owner of the '114 patent, Synopsys is entitled to judgment.

2. As to Magma's Fourth Counterclaim, by which Magma seeks a declaration that Magma is an owner, in whole or in part, of the '446 and '438 patents, Synopsys is entitled to judgment.

3. As to Magma's Sixth Counterclaim, by which Magma seeks a declaration that IBM is a joint owner of the '446 patent, Magma is entitled to judgment.

4. As to Magma's Tenth Counterclaim, by which Magma seeks a declaration that IBM is a joint owner of the '438 patent, Magma is entitled to judgment.

5. As to Magma's Seventh Affirmative Defense, by which Magma asserts that van Ginneken did not assign the inventions set forth in the '446 and '438 patents to Synopsys or, in the alternative, that only a partial interest in said patents was assigned to Synopsys and that a partial interest in said patents also is held by Magma and/or IBM, Magma is entitled to judgment to the extent Magma seeks a declaration that IBM and Synopsys are joint owners of the '446 and '438 patents.

IT IS SO ORDERED.

Dated: January 31, 2007

MAXINE M. CHESNEY
United States District Judge

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

SYNOPSYS, INC., a Delaware corporation, Plaintiff and Counter-Defendant, v. MAGMA DESIGN AUTOMATION, a Delaware corporation, Defendant and Counter-Claimant. AND RELATED COUNTER-CLAIMS.	Case No. C-04-03923 MMC (JCS) **STIPULATION AND ~~[PROPOSED]~~ ORDER RE: DISMISSAL [FRCP 41(a)(2)]**

WHEREAS, by agreement entered into between the parties on March 29, 2007, all claims and counterclaims in the above referenced action have been fully resolved;

WHEREAS, by agreement of the parties, this Honorable Court is respectfully requested to enter a dismissal with prejudice of the entire action, with each party to bear its own fees and costs incurred. Provided, however, pursuant to Section N. 2 of the Protective Order (Docket 665), the Protective Order and the obligations of the parties thereunder shall survive termination of this action;

NOW, THEREFORE, based on the foregoing, the parties request entry of an order by this Court as set forth herein.

Dated: March 30, 2007 DECHERT LLP

By:/s/Chris Scott Graham
Chris Scott Graham
Attorneys for Plaintiff and Counter-Defendant, SYNOPSYS, INC.

Dated: March 30, 2007 O'MELVENY & MYERS LLP

By:/s/George A. Riley
George A. Riley
Attorneys for Defendant and Counter-Claimant, MAGMA DESIGN AUTOMATION, INC.

I declare under penalty of perjury that concurrence in the filing of this document has been obtained from George A. Riley.

Dated: March 30, 2007 DECHERT LLP

By:/s/Chris Scott Graham
Chris Scott Graham
Attorneys for Plaintiff and Counter-Defendant, SYNOPSYS, INC.

ORDER

PURSUANT TO STIPULATION, AND GOOD CAUSE SHOWN, IT IS HEREBY ORDERED AS FOLLOWS:

1. Pursuant to FRCP 41(a)(2), this action is hereby dismissed with prejudice, with each party to bear its own fees and costs.

2. The Protective Order (Docket 665) and the obligations of the parties thereunder shall survive termination of this action.

DATED: April 16, 2007

HON. MAXINE M. CHESNEY
UNITED STATES DISTRICT COURT JUDGE